

STRUCTURE OF THIS MICROCARD

A01/1 = Structure of microcard

A03/1 = Special features

E01/1 = Disassembly of alternator

E22/1 = Assembly of alternator

N25/1 = Index

N26/1 = Table of contents

N28/1 = Editorial note

Continue: A02/1 Fig.: A01/2

	1					2				
	12345	67890	12345	67890	12345	678				
	SIS									
A	XXXXX	XXXXX	XXXXX	XX						
B	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
C	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
D	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX				
E	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XX				
F										
G										
H										
J										
K										
L										
M										
N									X	XXX
	12345	67890	12345	67890	12345	678				
	1					2				

Continue: A02/1

DESCRIPTION OF TROUBLE-SHOOTING INSTRUCTIONS

These trouble-shooting instructions are designed to outline the correct procedure to be employed when performing trouble-shooting on alternators.

Continue: M3

DESCRIPTION OF TROUBLE-SHOOTING INSTRUCTIONS

User prompting is provided on every page e.g.:

- Continue: B17/1
- Continue: B18/1 Fig.: B17/2
- Yes: B18/1 No: B15/1
- Yes: B17/1 No: B16/1 Fig.: B15/2

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: A03/1

SPECIAL FEATURES

This microcard contains repair and testing instructions together with the appropriate test specifications for the alternators 0 122 469 001, .. 002, .. 003 and .. 004.

N3 (RL) 28V 12/35 A

N3 (RL) 28V 15/50 A

N o t e :

Use was made of the alternator 0 122 469 001 in compiling these repair and testing instructions.

Continue: A03/2

The various alternator versions are to be taken from the corresponding service-part microcards.

Alternators 0 122 469 003 and .. 004 are incorporated.

The principal special features of the alternators 003 and 004 are as follows:

- * Ball bearing at drive end shield and collector-ring end shield filled with rolling-bearing grease UNIREX N3 (USA).

Continue: A04/1

ELECTRICAL TEST SPECIFICATIONS

Suppression capacitor 0.38-0.56
microfarad

Load current less than/equal to 10 A
Test speed 4000 min⁻¹

Regulator part number	Type	Regulated voltage (V)
0 192 053 010	EE 28V 3	27.5-28.3

Continue: A04/2

ELECTRICAL TEST SPECIFICATIONS

Resistance values

Type N3 <-> 28V	Stator (ohms)	Pole body with winding (ohms)
12 / 35 A	0.2 ... 0.3	12.3 ... 13.6
15 / 50 A	0.14 ... 0.2	8.0 ... 8.8

Continue: A05/1

POWER-OUTPUT TEST

Testing of alternator with regulator:

Keep alternator voltage of 16 V
constant by varying load current I_L .

Type	Speed (min-1)	Load (A)
N3<->28V12/35A	1 500	15
	4 000	37
N3<->28V15/50A	1 500	19
	5 000	49

Continue: A05/2

POWER-OUTPUT TEST

C a u t i o n :

Pay attention to accident prevention
regulations!

After completion of test, allow
alternator to run for approximately
5 minutes at 7000 min-1.

Continue: A06/1

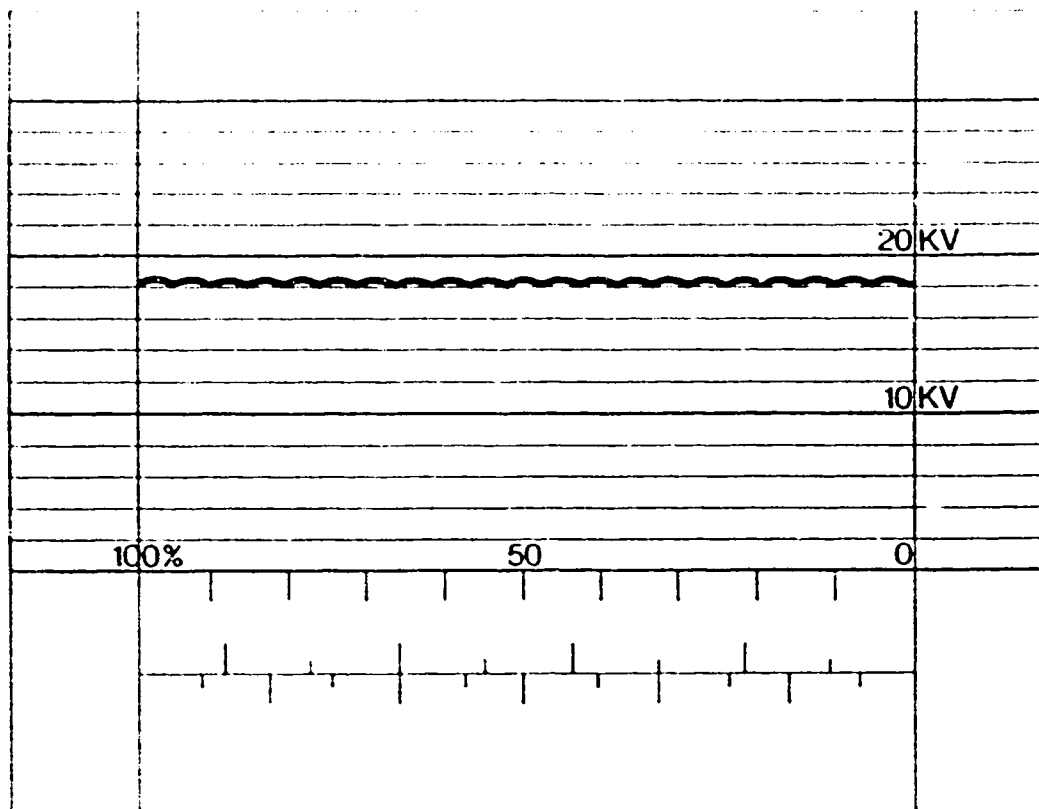
"Go" oscillogram:

This is the image provided by a properly functioning alternator. The D.C. voltage supplied has a small harmonic component.

Small spikes may be superimposed on the oscillogram illustrated if the alternator regulator is in operation.

The regulator can be shut down by connecting up a load (e.g. load impedance).

Continue: A07/1 Fig.: A06/2

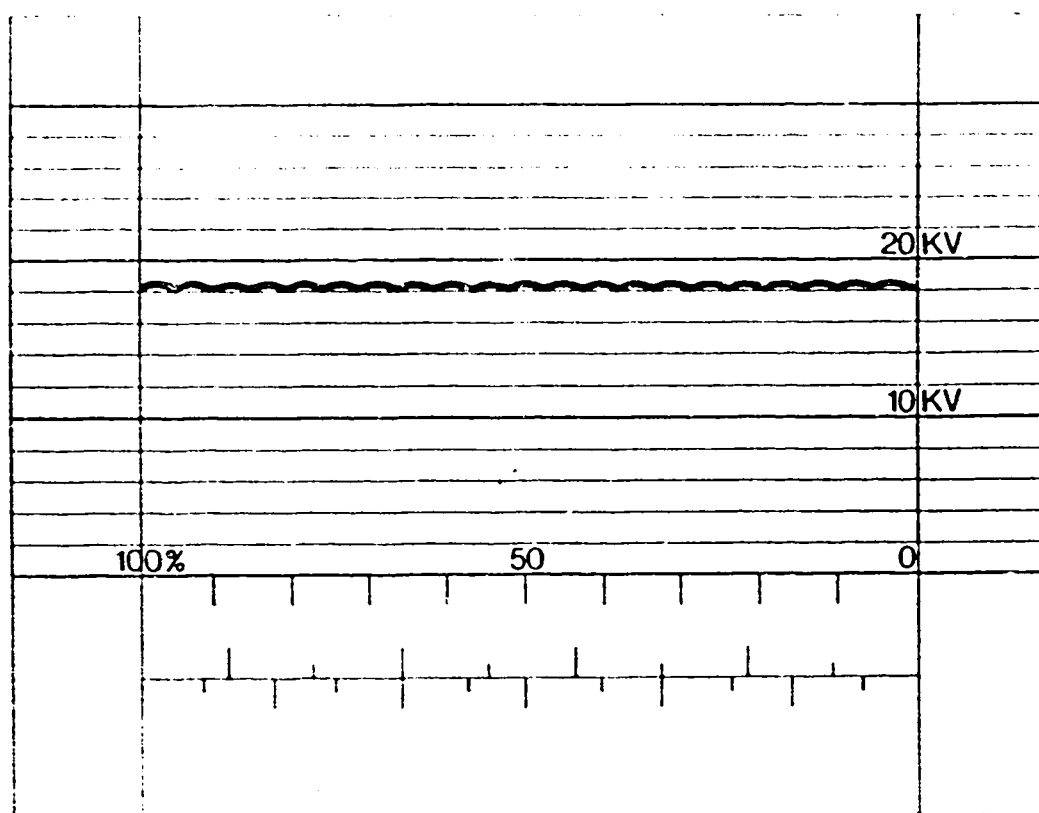


"Go" oscillogram:

In order to be able to compare such images, the respective image is to be adjusted by means of the oscilloscope vertical control such that it approximately fits in between the 10 and 20 kV division.

N o t e : Several faults may occur together.

Continue: A08/1 Fig.: A07/2



KME00052

MECHANICAL TEST SPECIFICATIONS

Air gap on one side between rotor and stator 0.3 mm

Eccentricity:
Rotor mount at bearing points.

Outside diameter of rotor 0.05 mm

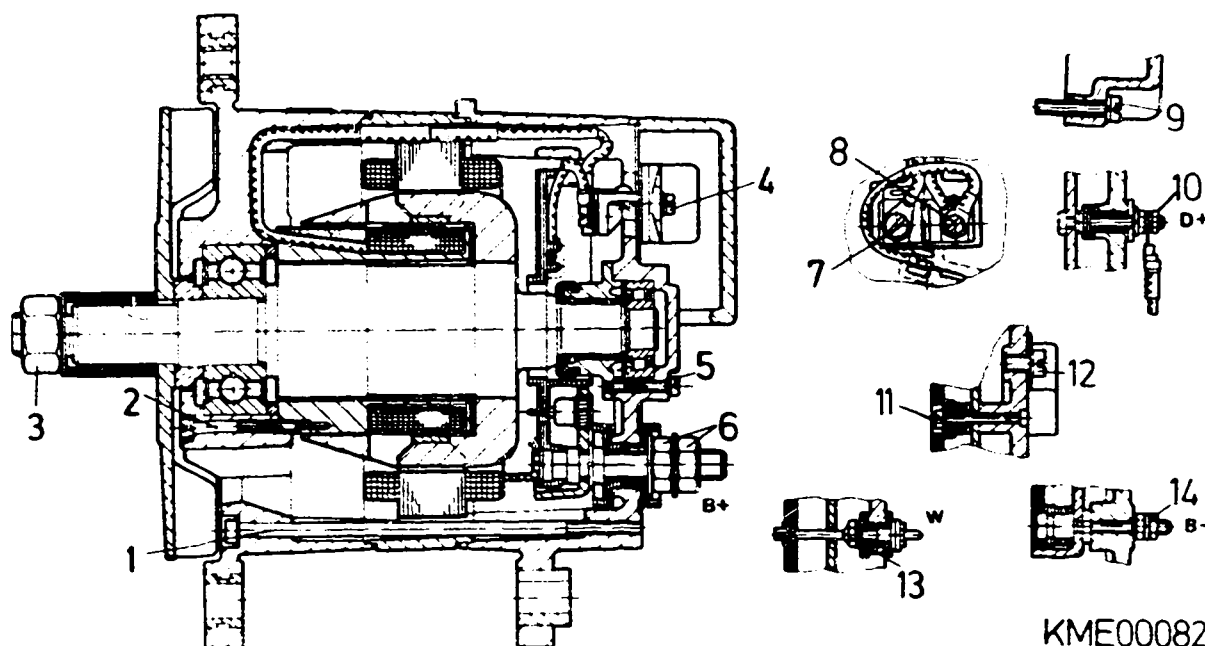
Continue: A09/1

TIGHTENING TORQUES FOR ALTERNATORS

0 122 469 ...

Item	1	=	4.1...5.5	Nm
Item	2	=	2.1...2.8	Nm
Item	3	=	95 ...112	Nm
Item	4	=	1.5...1.8	Nm
Item	5	=	1.1...1.4	Nm
Item	6	=	bottom nut	22...30 Nm
			top nut	7.5...10 Nm
Item	7	=	2.1...2.8	Nm
Item	8	=	1.5...1.8	Nm
Item	9	=	2.3...3.0	Nm
Item	10	=	bottom nut	1.5...1.8 Nm
			top nut	1.5...1.8 Nm

Continue: A10/1 Fig.: A09/2

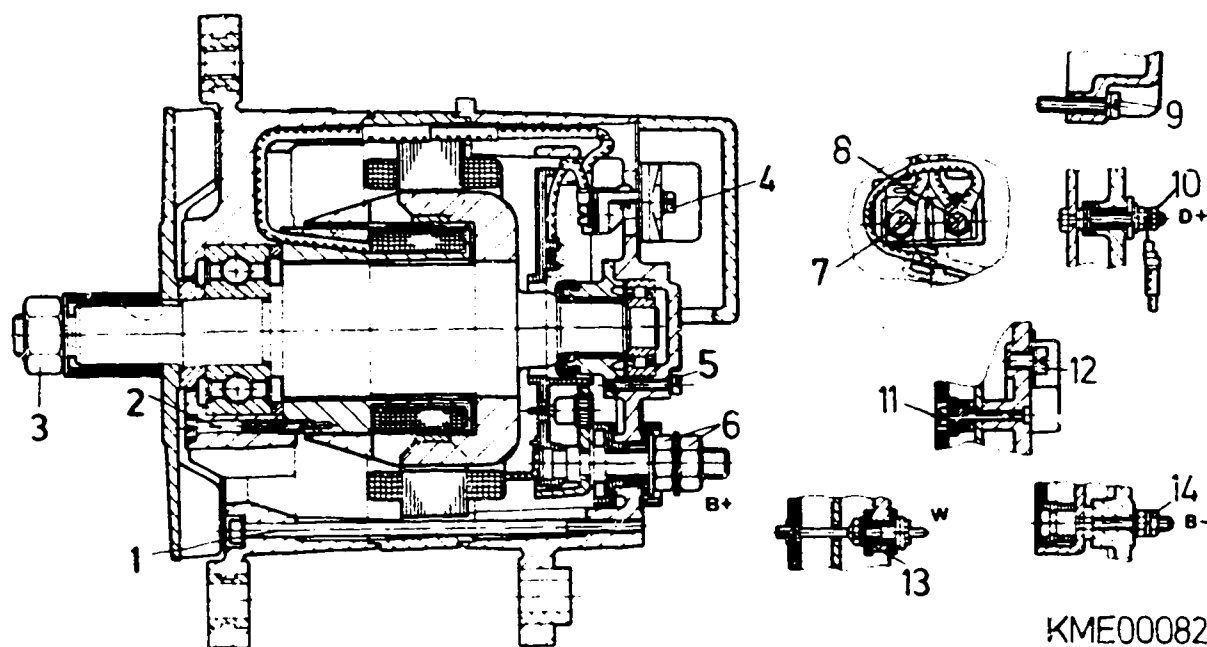


TIGHTENING TORQUES FOR ALTERNATORS

0 122 469 ...

Item 11	=	1.5...1.8 Nm	
Item 12	=	2.3...3.0 Nm	
Item 13	=	bottom nut	2.1...2.8 Nm
		top nut	2.1...2.8 Nm
Item 14	=	bottom nut	2.1...2.8 Nm
		top nut	0.7...0.9 Nm

Continue: A11/1 Fig.: A10/2

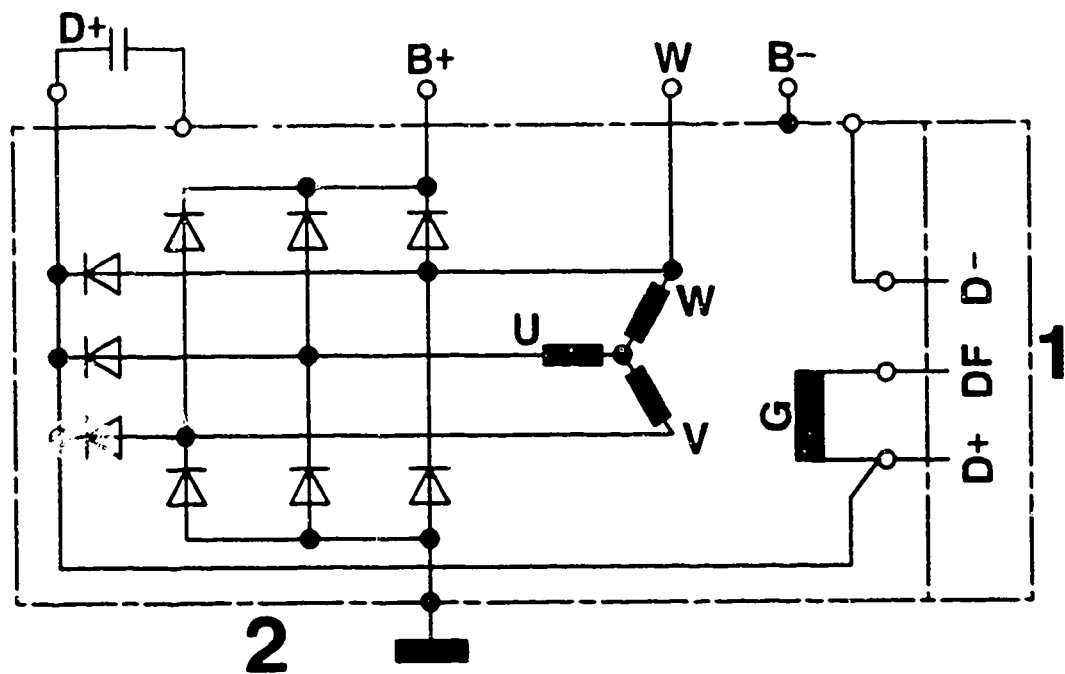


DIAGRAMS:

Alternator N3 (RL) 28V 12/35A

1 = Regulator
2 = Alternator

Continue: A12/1 Fig.: A11/2



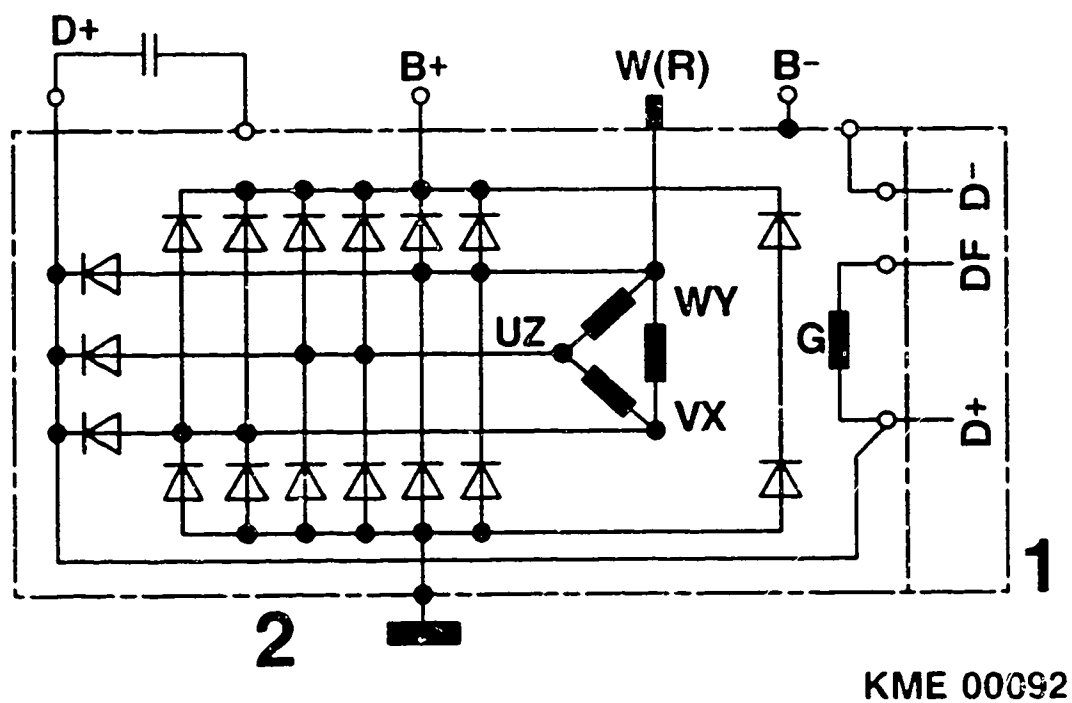
KME 00085

DIAGRAMS:

Alternator N3 (RL) 28V 15/50A

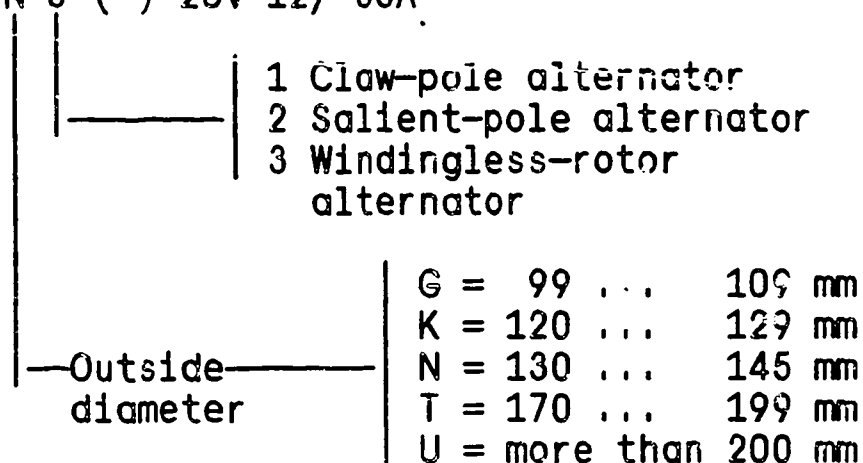
1 = Regulator
2 = Alternator

Continue: A13/1 Fig.: A12/2



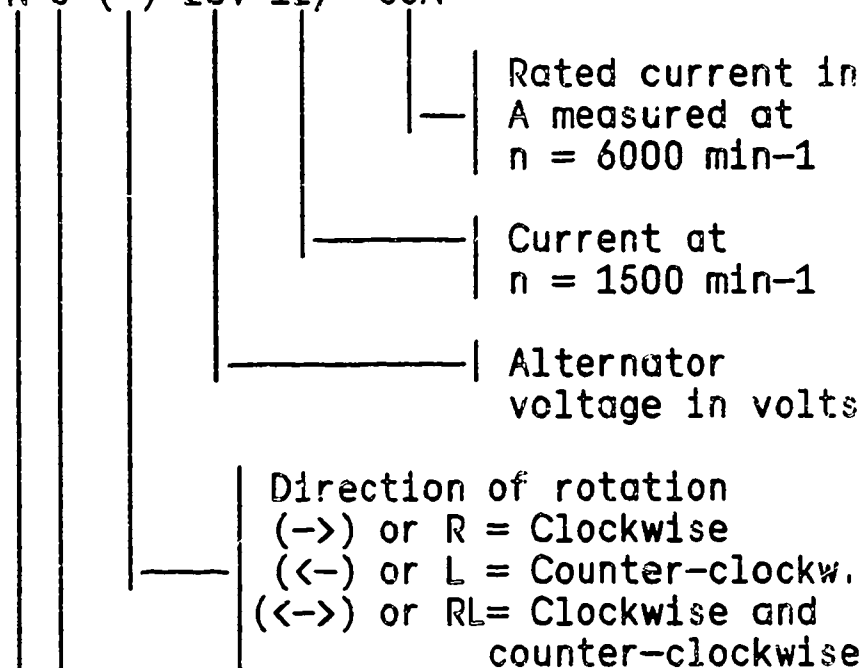
Explanation of type code on alternator e. g.: N3 () 28 V 12/ 35A

N 3 () 28V 12/ 35A.



Continue: A13/2

N 3 () 28V 12/ 35A



Continue: A14/1

CLEANING OF PARTS

CAUTION !
DANGER OF FIRE

To provide interference suppression for receivers and transmitters, alternators are fitted with capacitors with a long storage time.

Washing out alternator components may result in capacitor discharge when immersing them in cleaning fluids. This can cause combustible liquids to catch fire.

Continue: A14/2

CLEANING OF PARTS

For this reason, parts featuring capacitors are only to be washed out in HAKU 1025/6.

Continue: A15/1

TESTERS, TOOLS AND ADHESIVES

Testers:

Alternator test bench

EFLJ 25 ..	0 680 110 ...
or EFLJ 70 A	0 680 104 ...
or EFLJ 91	0 683 300 100

or combination test bench

(only for load up to max. 43 A)

EFAW 275 .. 0 681 107 ...

Mounting plate EFLJ 66/3

for clamping alternators with hinge
mounting to alternator test bench

EFLJ 25, 70

Continue: A15/2

TESTERS, TOOLS AND ADHESIVES

Testers:

Parts set 1 687 000 042
for clamping alternators with hinge
mounting to combination test bench
EFAW 275 ..

For additional check or test:

Ignition oscilloscope (all versions)

or

Bosch engine tester (all versions)

Continue: A16/1

TESTERS, TOOLS AND ADHESIVES

Testers:

Test panel EFAW 81 0 681 169 013
 or KDAW 9984

Transformer panel
 EFAW 82 0 681 169 014
 or KDAW 9995

Insulation tester
 EFAW 84 (contained in
 or KDAW 9983 scope of
 delivery of
 EFAW 81 or
 KDAW 9984)

Continue: A16/2

TESTERS, TOOLS AND ADHESIVES

Testers:

Dial EFAW 7 1 687 233 011
indicator

Magnetic T-M1 4 851 601 124
stand (EW/MS1 B1 0 601 980 001)

Alternator tester
 EFAW 192 0 681 101 403
 or
 WPG 012.00 0 684 201 200

Voltage stabilizer up to 30 V
 commercially
 available

Continue: A17/1

TESTERS, TOOLS AND ADHESIVES

Testers:

3 feeler gauges 0.15...0.6 mm
KDZV 7399

Electric tester

ETE 014.00 0 684 101 400

Test lamp 24 V 10 W

commercially
available

Continue: A17/2

TESTERS, TOOLS AND ADHESIVES

Tools:

Pressing-on mandrel for cylindrical
roller-bearing inner race
KDLJ 6002

Securing device for pulley
KDLJ 6006

Puller for cylindrical-roller bearing
KDLJ 6009

Die spigot for mandrel press
KDLJ 6010

Continue: A18/1

TESTERS, TOOLS AND ADHESIVES

Tools:

Press-in and press-out mandrel for
sliding bushing KDLJ 6015

Receiving and backing plug for
sliding bushing KDLJ 6016

Press-in mandrel for cylindrical-
roller bearing KDLJ 6018

Puller bell KDAW 9995/0/1

Extension screw with cone
KDAW 9995/14

Continue: A18/2

TESTERS, TOOLS AND ADHESIVES

Tools:

Puller for removing ball-bearing
inner races KDAW 9996

Clamping support KDAW 9999

Mandrel press commercially
available

V-blocks commercially
available

Soldering iron 180 W commercially
available

Continue: A19/1

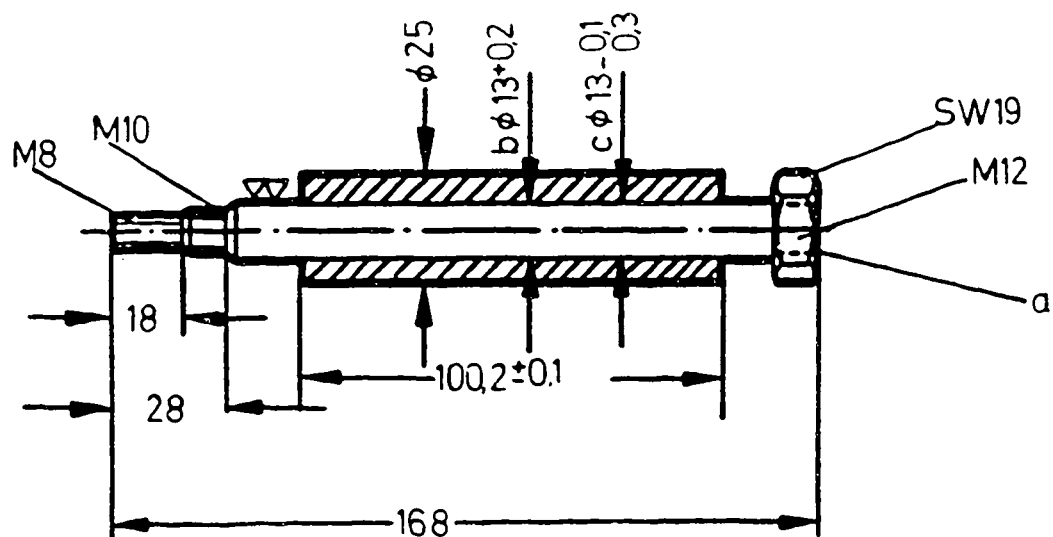
TESTERS, TOOLS AND ADHESIVES

User-manufactured tool:

Positioning pin for drive end shield and rectifier end shield as well as mandrel (material: C45K) with sleeve (material: St34) for testing on alternator test bench.

a = Thread, staked
b = Sleeve
c = Pin

Continue: A20/1 Fig.: A19/2



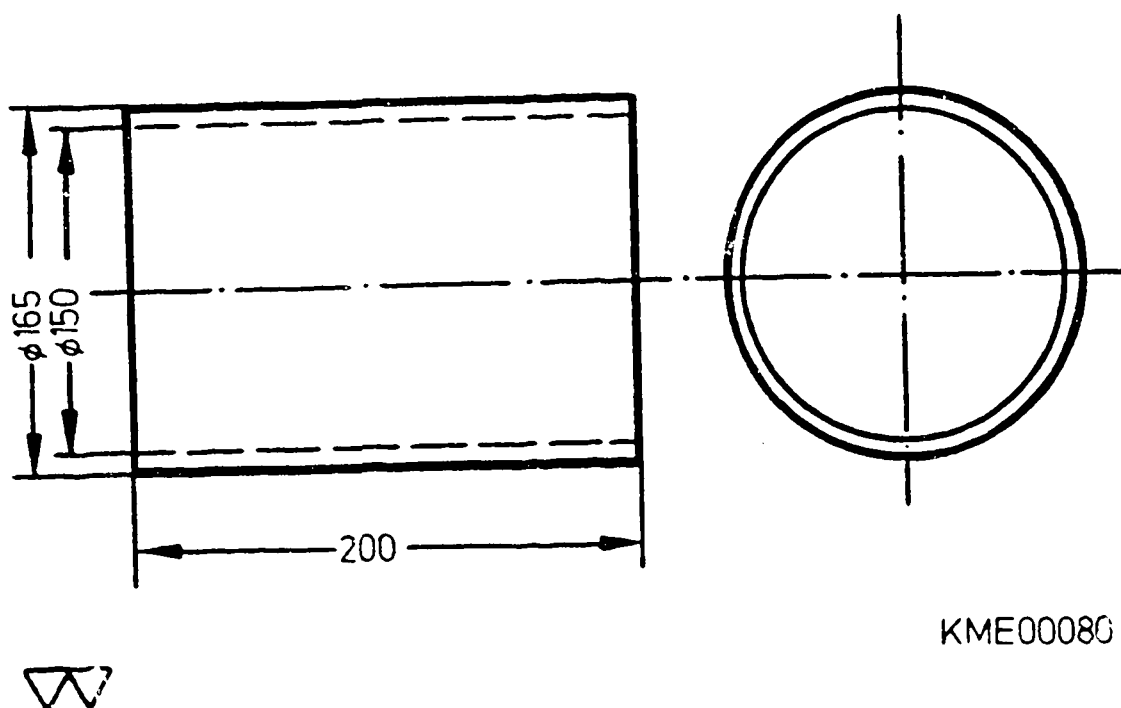
KME00081

TESTERS, TOOLS AND ADHESIVES

User-manufactured tool:

Pressing-out ring for rotor
(material: St37).

Continue: A21/1 Fig.: A20/2



KME00080

TESTERS, TOOLS AND ADHESIVES

LUBRICANTS AND ADHESIVES

Rolling-bearing grease

Ft1 v 34	50g tube	5 700 009 005
	250g tube	5 700 009 025

Rolling-bearing grease UNIREX N3 (USA)		
		5 975 560 125

Molycote paste

Ft70 v 1	250g tin	5 700 040 125
----------	----------	---------------

Putty, consisting of 2 components

KK64 v 7 A	50g tin	5 703 556 105
------------	---------	---------------

KK64 v 7 B	50g tin	5 703 557 105
------------	---------	---------------

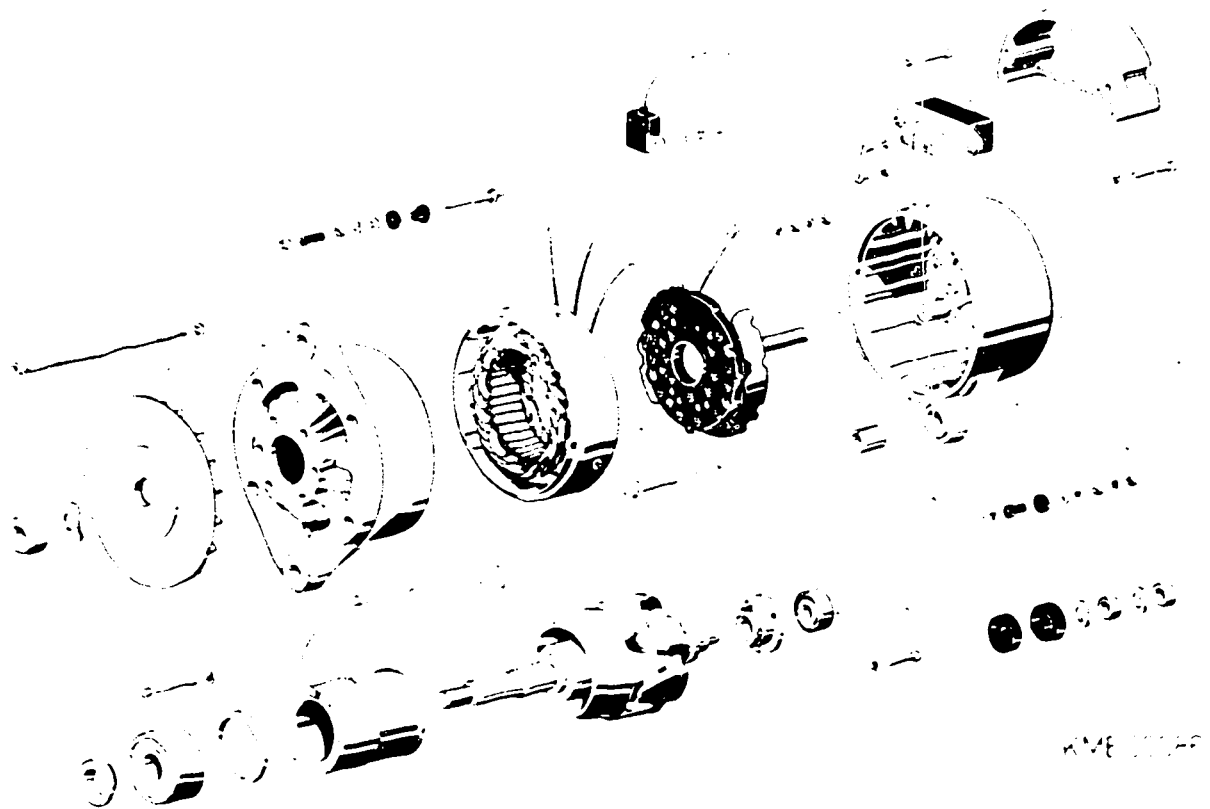
Solder		5 290 429 150
--------	--	---------------

Elastosil	commercially available	
	Wacker Chemie GmbH,	
	Munich	

Continue: A22/1

EXPLODED VIEW - ALTERNATOR 0 122 469 ..

Continue: B01/1 Fig.: A22/2



WAVE 12249

DISASSEMBLY OF ALTERNATOR AND TESTING OF COMPONENTS

Clamp alternator in position in clamping support KDAW 9999.

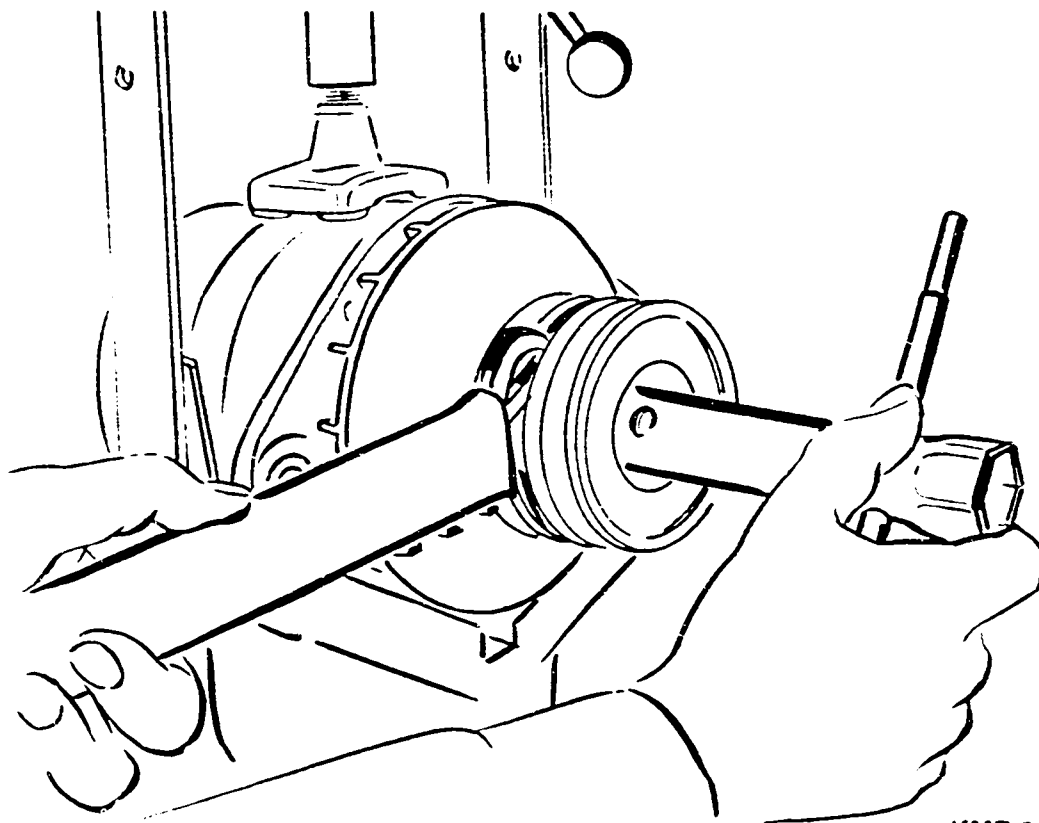
C a u t i o n :

Only tension housing slightly !

Hold pulley with suitable holding device e.g. KDLJ 6006 and loosen fastening nut with socket wrench 24 mm.

Remove pulley and fan.

Continue: B02/1 Fig.: B01/2



KME 00064

ALTERNATOR DISASSEMBLY

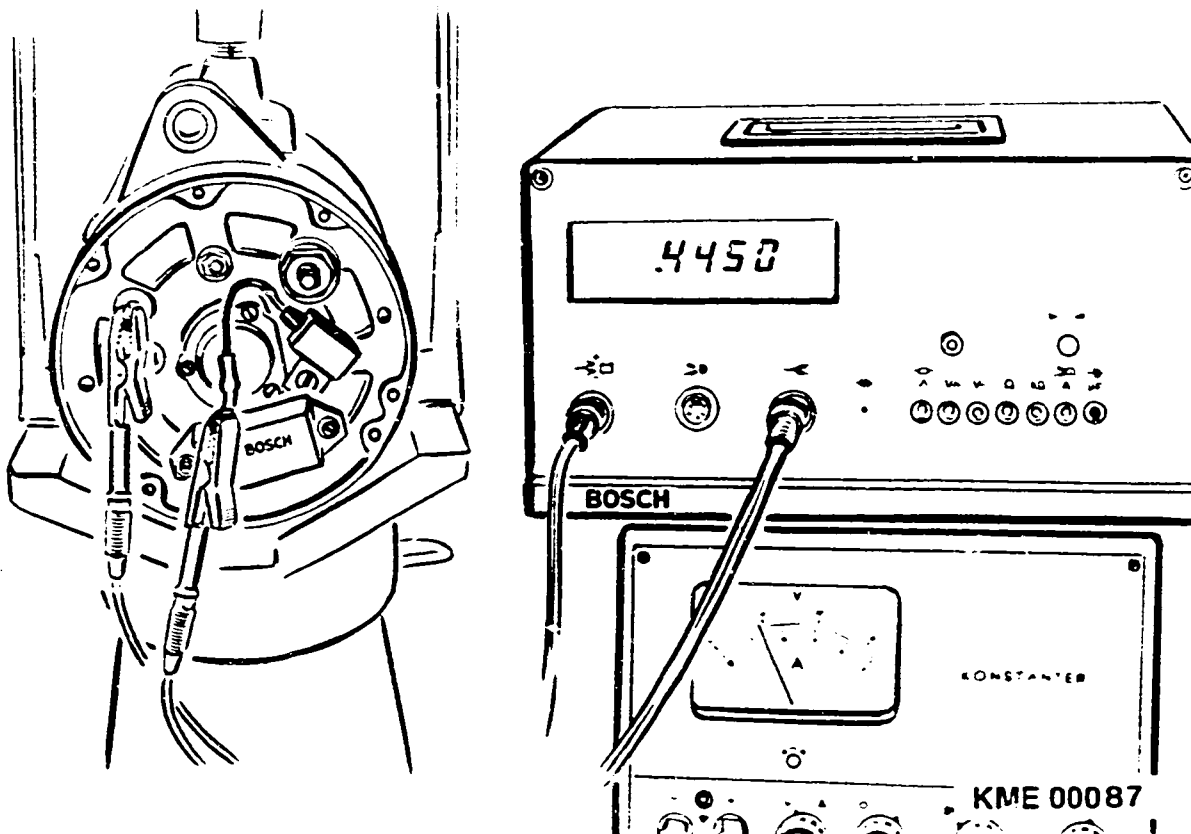
Testing suppression capacitor:

Remove closing cover of rectifier.
Detach lead of suppression capacitor
from D+ connection. Connect up
electric tester between lead of
suppression capacitor and terminal B-
of alternator.

Set value: 0,38...0,56 microfarad
If set value is not attained, replace
defective suppression capacitor.

After testing, discharge suppression
capacitor by shorting it, so as to
prevent cleaning fluid catching fire
when cleaning components.

Continue: B03/1 Fig.: B02/2



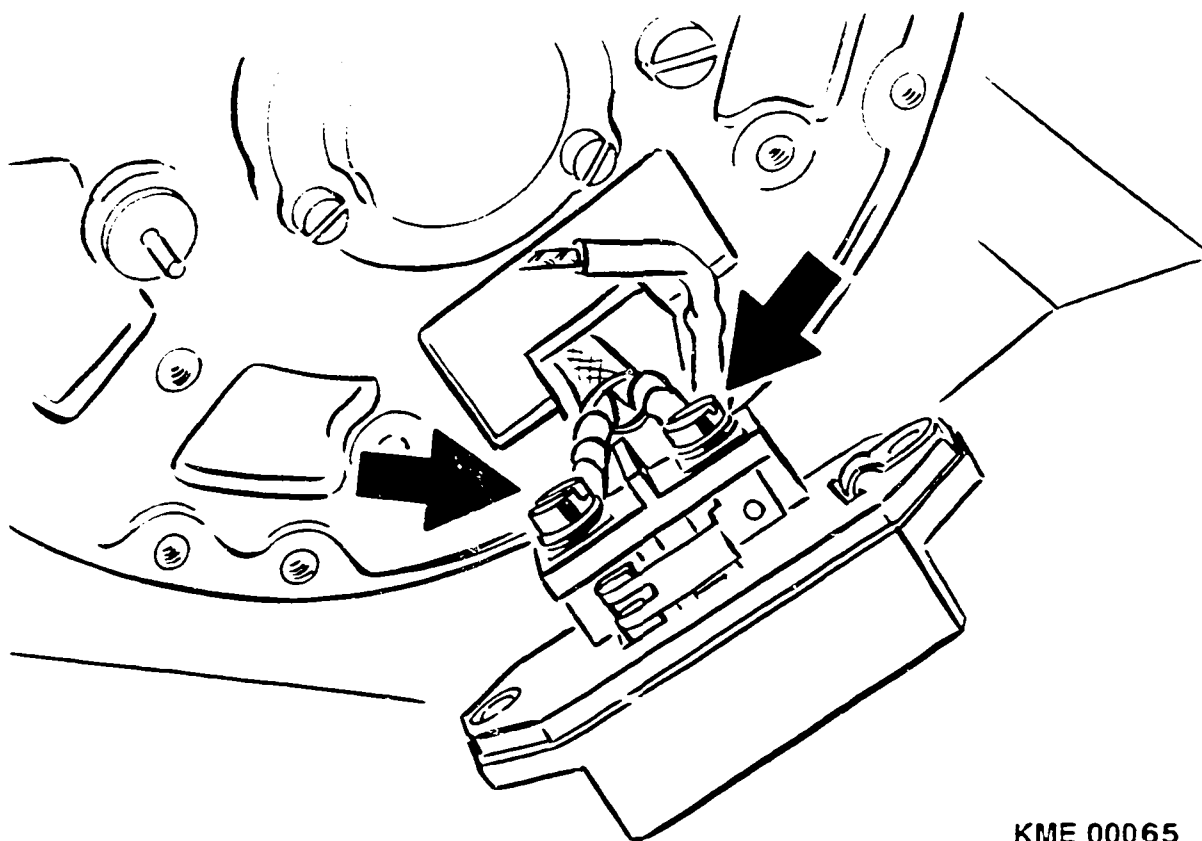
ALTERNATOR DISASSEMBLY

Unscrewing regulator;

Unscrew regulator fastening screws.

Loosen connections D+ and DF on back of regulator (picture, arrows); remove regulator.

Continue: B04/1 Fig.: B03/2



KME 00065

ALTERNATOR DISASSEMBLY

Testing regulator:

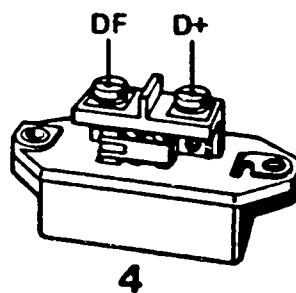
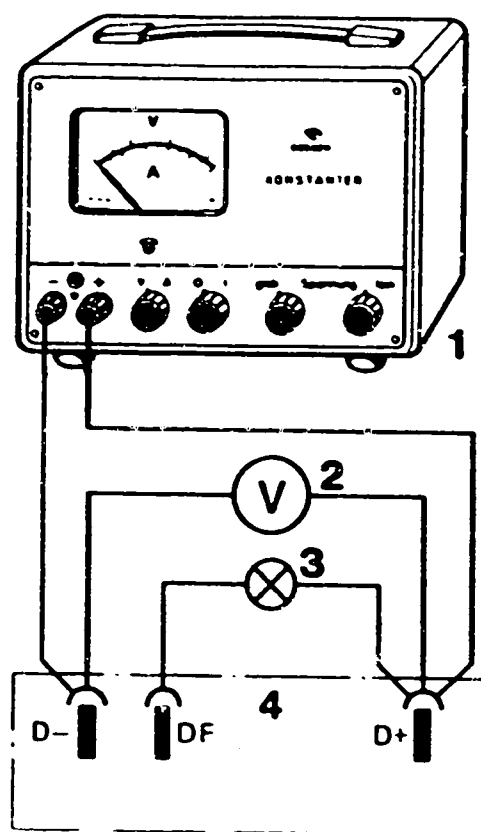
Make test circuit in accordance with terminal diagram.

Increase voltage (test lamp comes on).

Test lamp must go out within regulated-voltage tolerance range
(27.5...28.3 V)

- 1 = Voltage stabilizer
- 2 = Voltage tester
- 3 = Test lamp 24 V 10 W
- 4 = Regulator

Continue: B05/1 Fig.: B04/2



KME00088

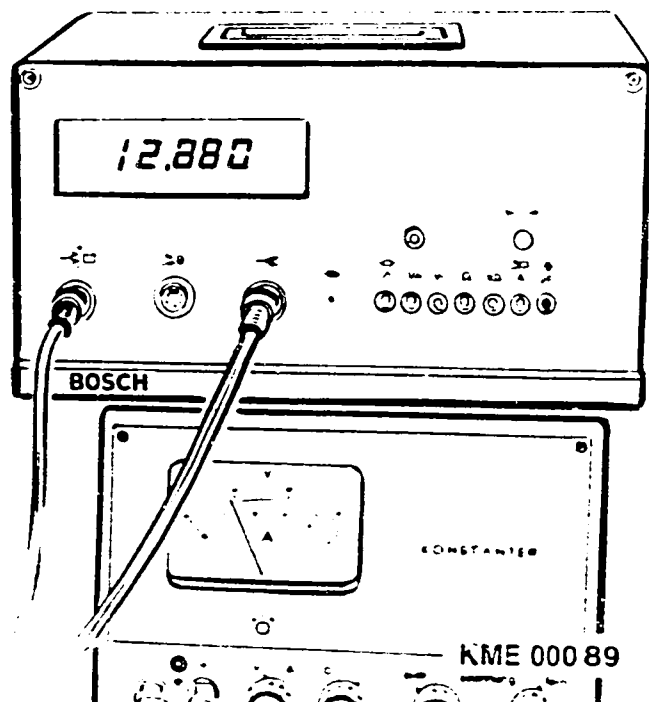
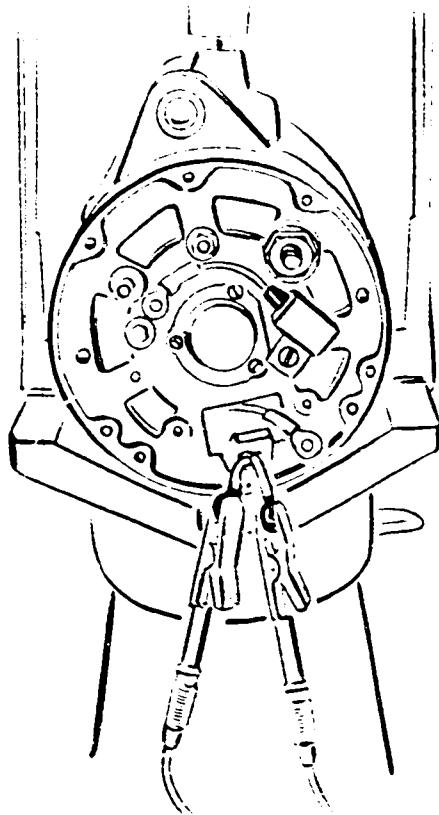
ALTERNATOR DISASSEMBLY

Testing resistance of pole body
with winding (excitation winding):

Test resistance of pole body with
winding (excitation winding) using
electric tester ETE 014.00.

Type N3 <—> 28V	Pole body with winding (ohms)
12 / 35 A	12.3...13.6
15 / 50 A	8.0... 8.8

Continue: B06/1 Fig.: B05/2



ALTERNATOR DISASSEMBLY

Testing resistance of pole body with winding (excitation winding):

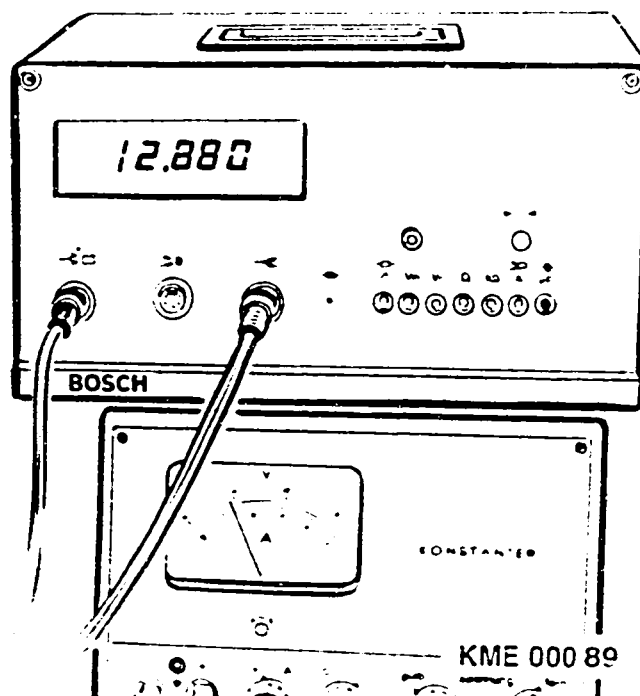
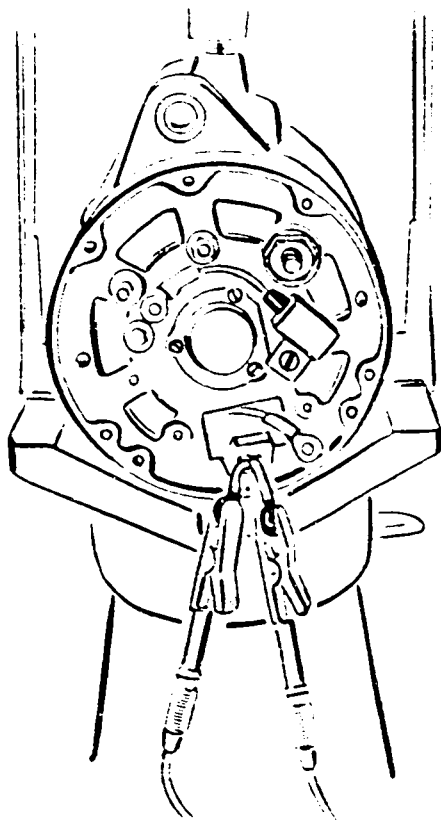
If these values are not attained, the pole body with winding is defective.

Test pole body with winding (excitation winding) for short to ground with test prods EFAW 84 between B- and winding ends.

Test voltage 80 V AC

Test lamp must not light up.

Continue: B07/1 Fig.: B06/2



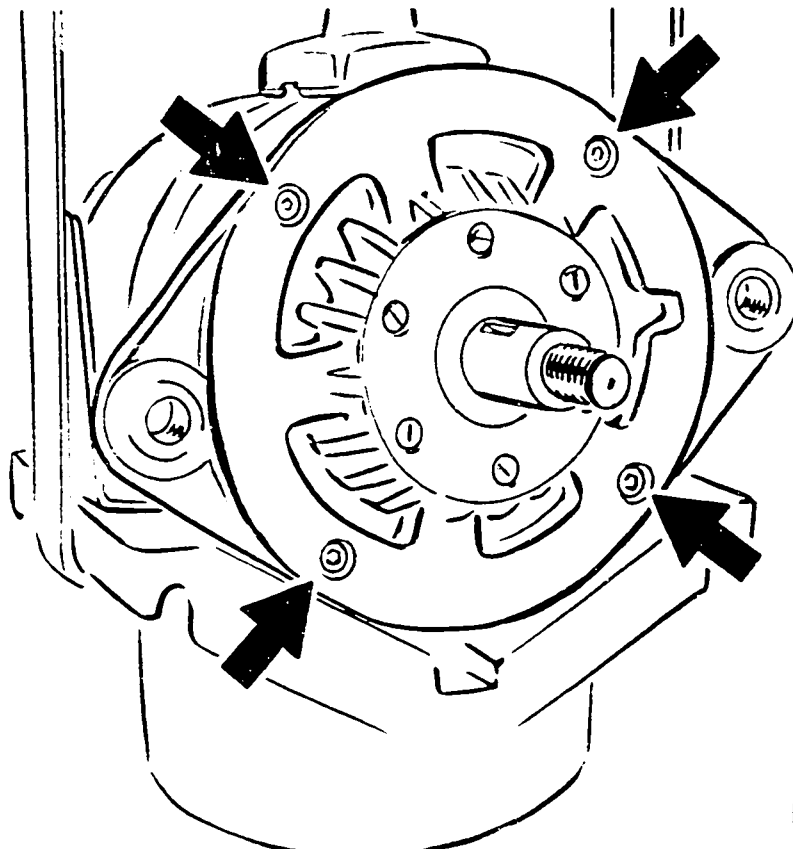
ALTERNATOR DISASSEMBLY

Removing drive end shield:

Loosen and remove four hexagon-socket-head cap screws (picture, arrows) on drive end.

Pull alternator apart and remove drive end shield with rotor without winding (windingless rotor) and pole body with winding.

Continue: B08/1 Fig.: B07/2



KME 00066

ALTERNATOR DISASSEMBLY

Testing rectifier:

Test function of rectifier in wired-up condition with EFAW 192 or WPG 012.00. Capacitor not connected. Pay attention to switch position on tester.

Measurement points:

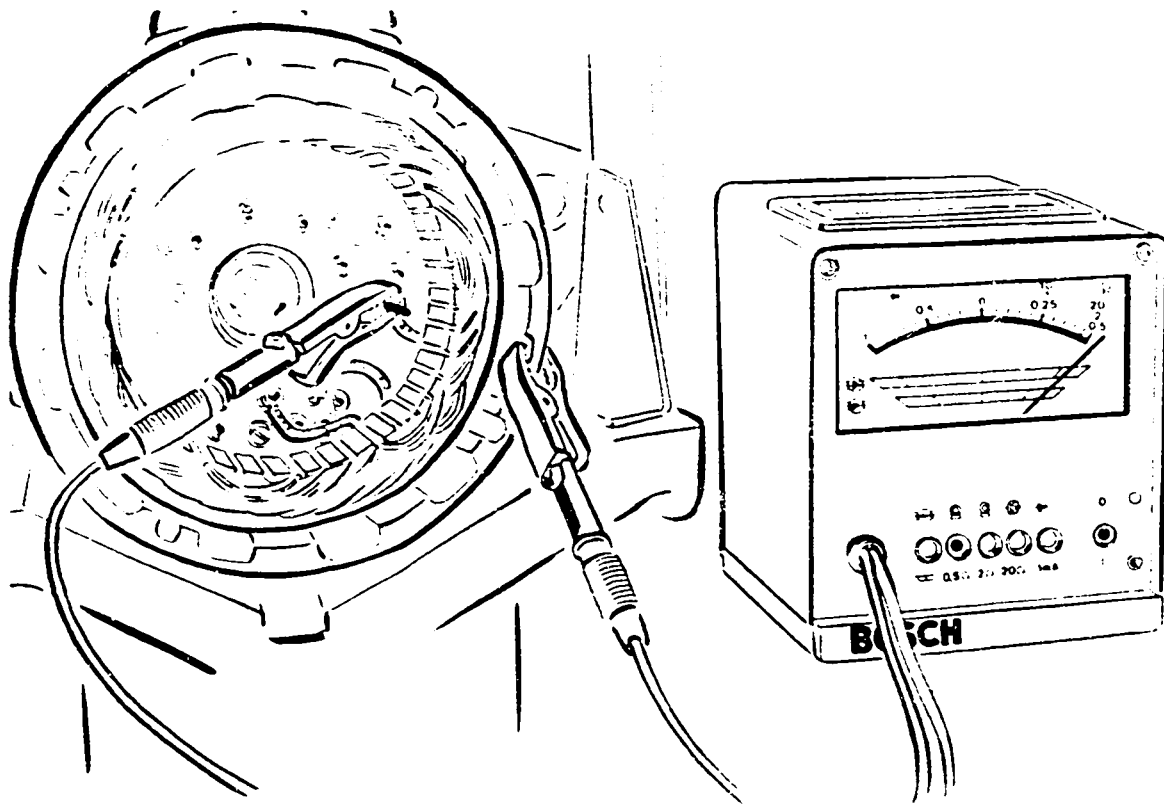
Housing and winding ends

B+ and soldered joint, stator connections

D+ and soldered joint, stator connections

Rectifier is O.K. if pointer of tester is in green range on performing these tests.

Continue: B09/1 Fig.: B08/2



KME 00090

ALTERNATOR DISASSEMBLY

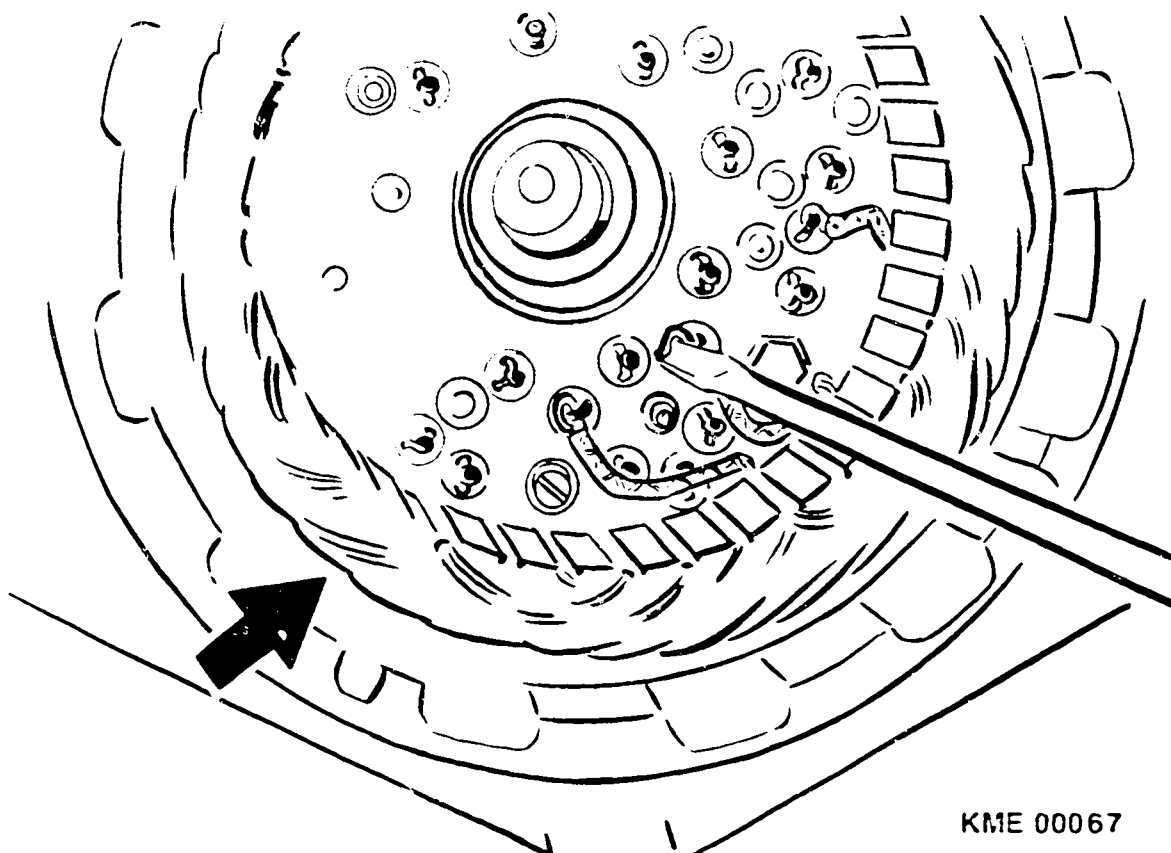
Removing stator (picture, arrow):

Remove tin-lead solder from phase connections with soldering iron.

Bend open wire ends with screwdriver and pull out of fastening eyelets with pointed pliers.

Remove stator.

Continue: B10/1 Fig.: B09/2



KME 00067

ALTERNATOR DISASSEMBLY

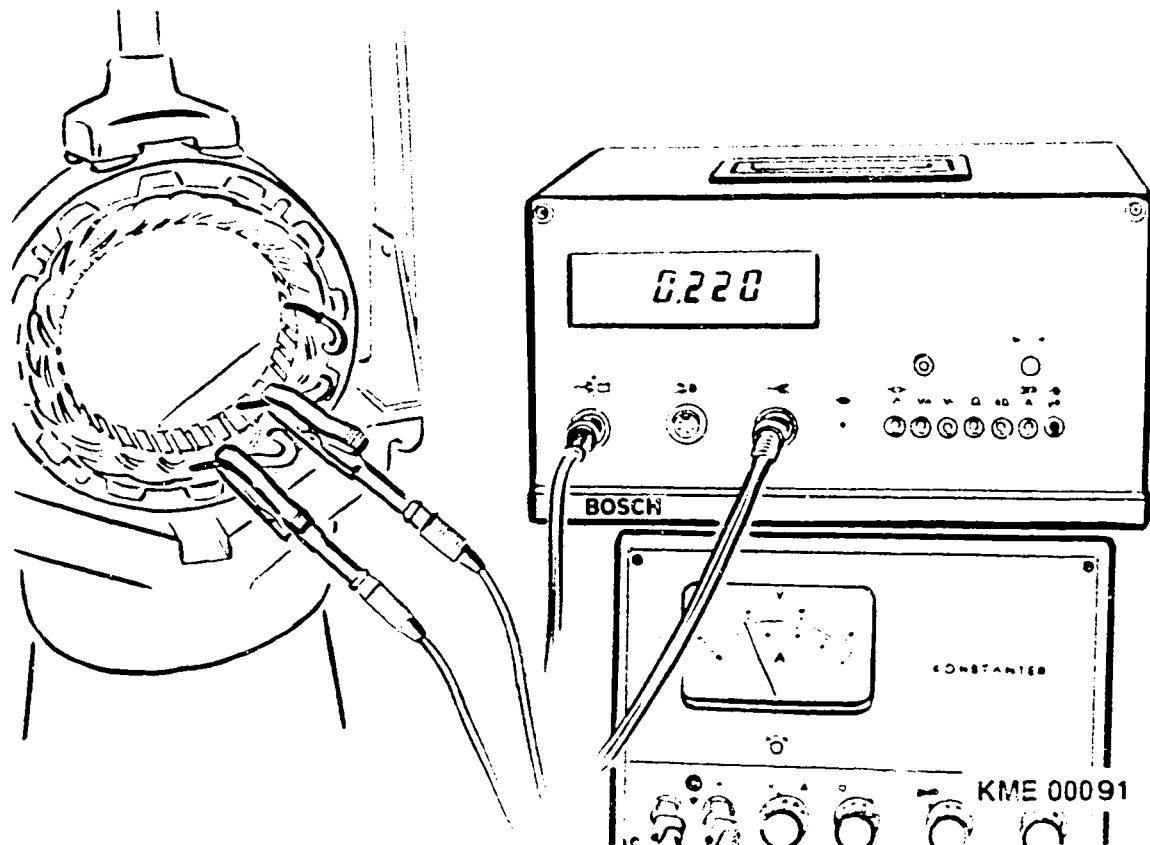
Testing resistance and ground connection of stator:

Connect up EFAW 192 or WPG 012.00 as shown.

Pay attention to switch position on tester.

Type N3 <→ 28V	Stator (ohms)
12 / 35 A	0.2 ... 0.3
15 / 50 A	0.14 ... 0.2

Continue: B11/1 Fig.: B10/2



ALTERNATOR DISASSEMBLY

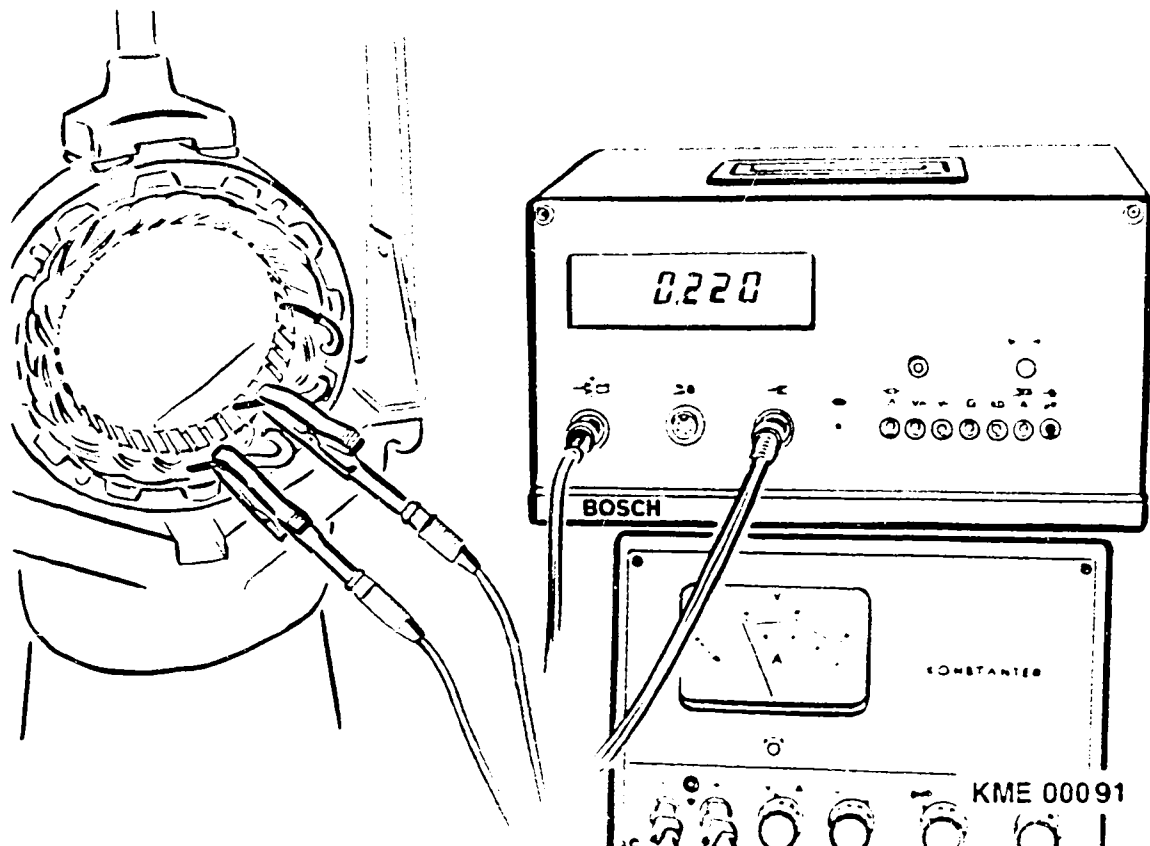
Testing resistance and ground connection of stator:

The stator is defective if these values are not attained. Check stator for short to ground with test prods EFAW 84 between winding ends and stator frame.

Test voltage 80 V AC

Test lamp must not light up.

Continue: B12/1 Fig.: B11/2



ALTERNATOR DISASSEMBLY

Renewing rectifier:

C a u t i o n : Do not detach terminal W

Defective rectifier is only to be replaced as complete unit.

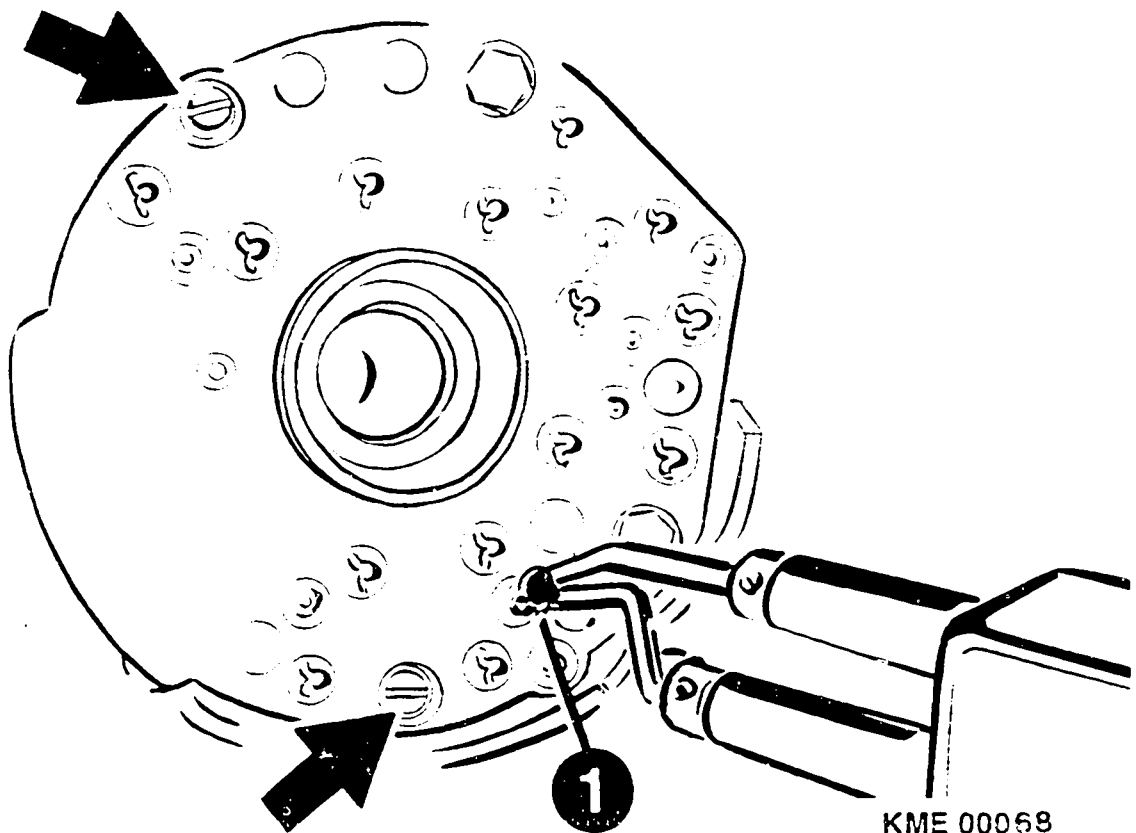
To do so, unsolder terminal W (can be seen from soldering sleeve, picture, item 1).

Re-use soldering sleeve on assembly.

Unscrew fillister-head screws (picture, arrows). Remove on outside of rectifier.

Terminals are permanently attached to rectifier.

Continue: B13/1 Fig.: B12/2



ALTERNATOR DISASSEMBLY

Removing cylindrical-roller bearing:

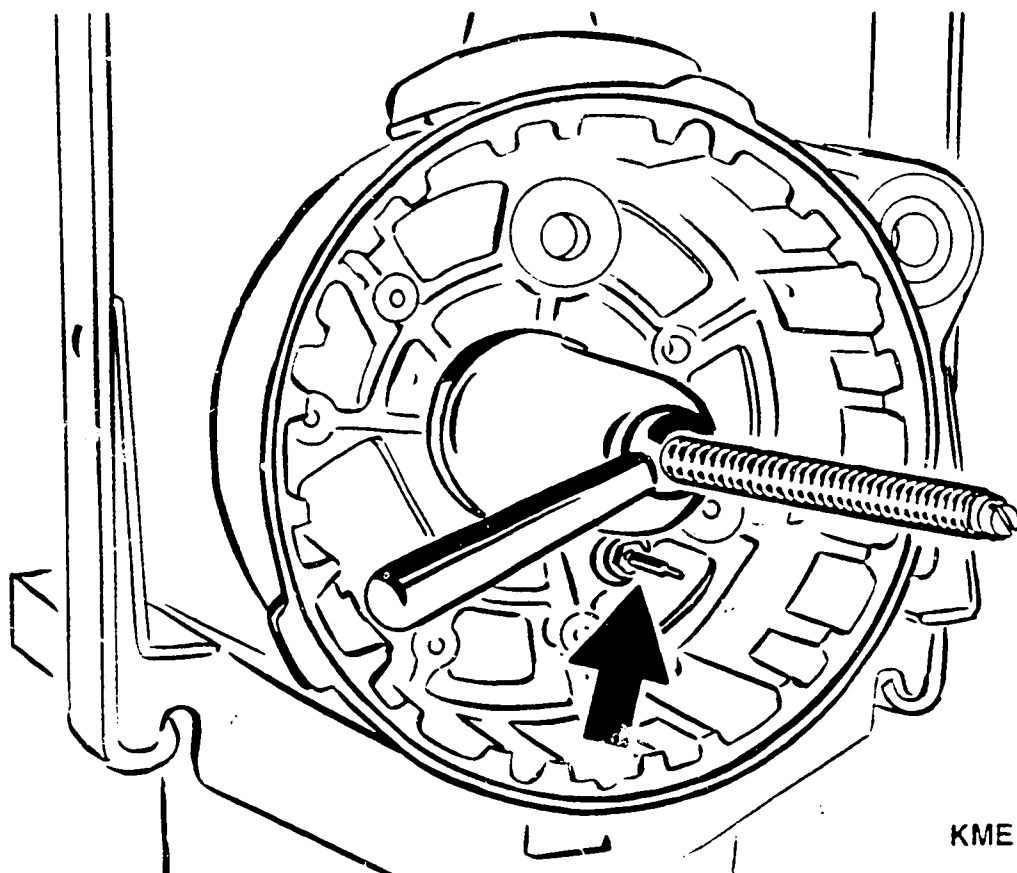
The cylindrical-roller bearing in the rectifier end shield must always be renewed when the alternator is disassembled.

Loosen fillister-head screws on outside of rectifier end shield.

Use puller KDLI 6009 to remove cylindrical-roller bearing (picture).

If cylindrical-roller bearing cannot be pulled out of bearing seat, destroy bearing cage and remove rollers.

Continue: B14/1 Fig.: B13/2



ALTERNATOR DISASSEMBLY

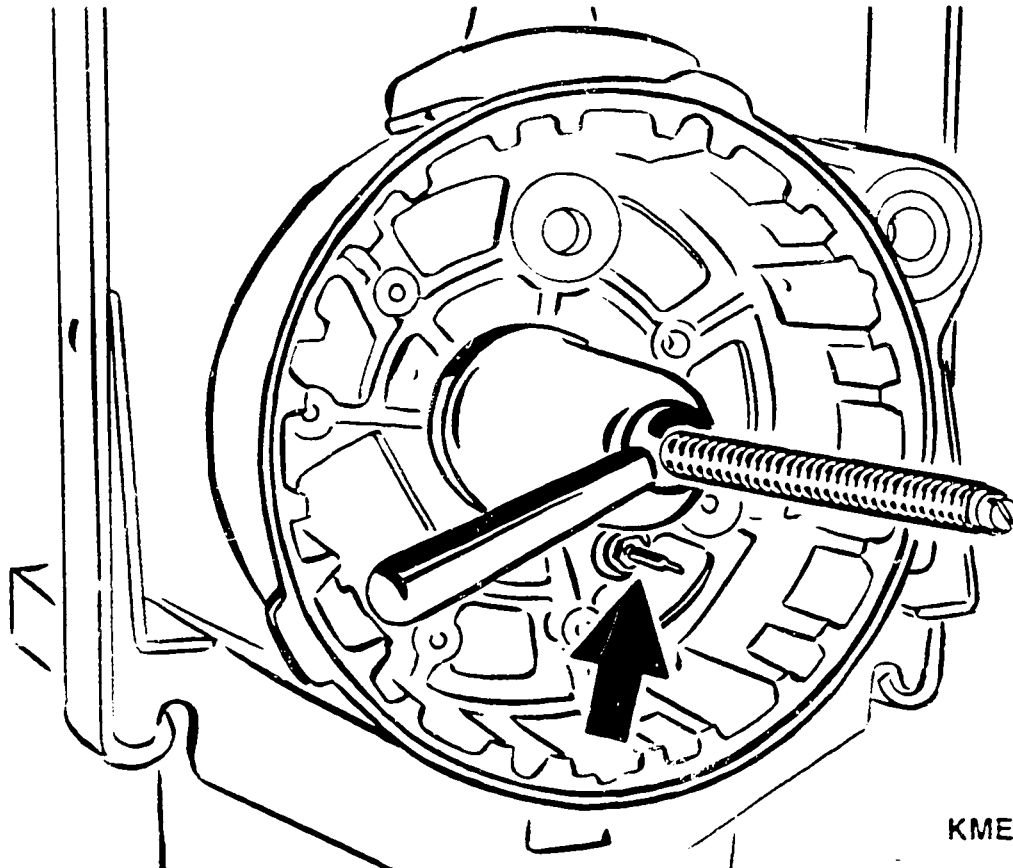
Removing cylindrical-roller bearing:

Use spring collet KDAW 9995/6 to remove remainder of cylindrical-roller bearing.

C a u t i o n :

Always also remove inner ring on rotor without winding (windingless rotor) using puller KDAW 9989 and renew. Take care not to damage connection "W" (picture, arrow).

Continue: B15/1 Fig.: B14/2



KME 00069

ALTERNATOR DISASSEMBLY

Freeing expansion bushing:

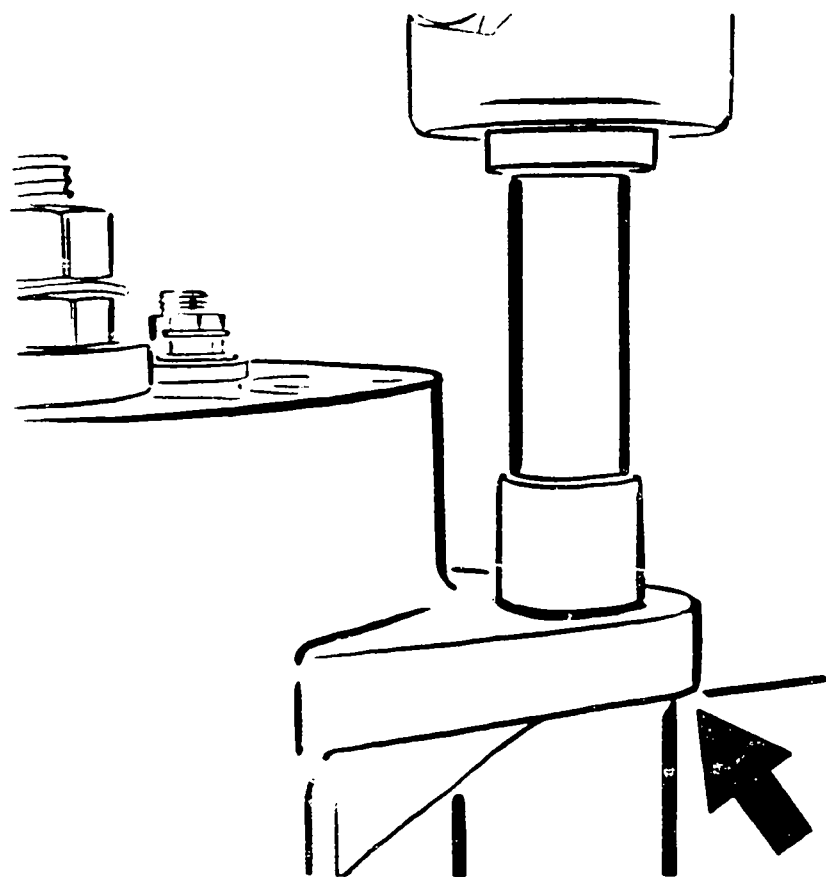
Always use commercially available mandrel press for pressing in and pressing out -- do not knock!

Press out expansion bushing.

Lubricate hole with molycote paste.

Use self-produced fitting mandrel to press in expansion bushing as indicated by arrow.

Continue: B16/1 Fig.: B15/2



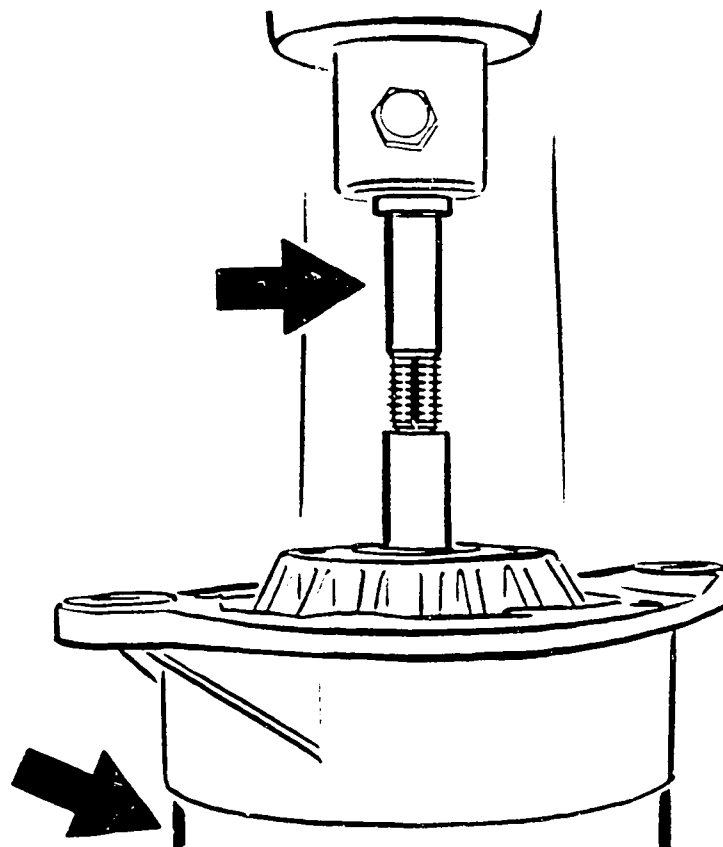
KME 00070

ALTERNATOR DISASSEMBLY

Pressing rotor without winding (windingless rotor) out of drive end shield:

Remove rotor without winding (windingless rotor) only in the event of bearing damage or noise as well as in the case of a defective pole body with winding (excitation winding), shaft or end shield.

Continue: B17/1 Fig.: B16/2



KME 00J71

ALTERNATOR DISASSEMBLY

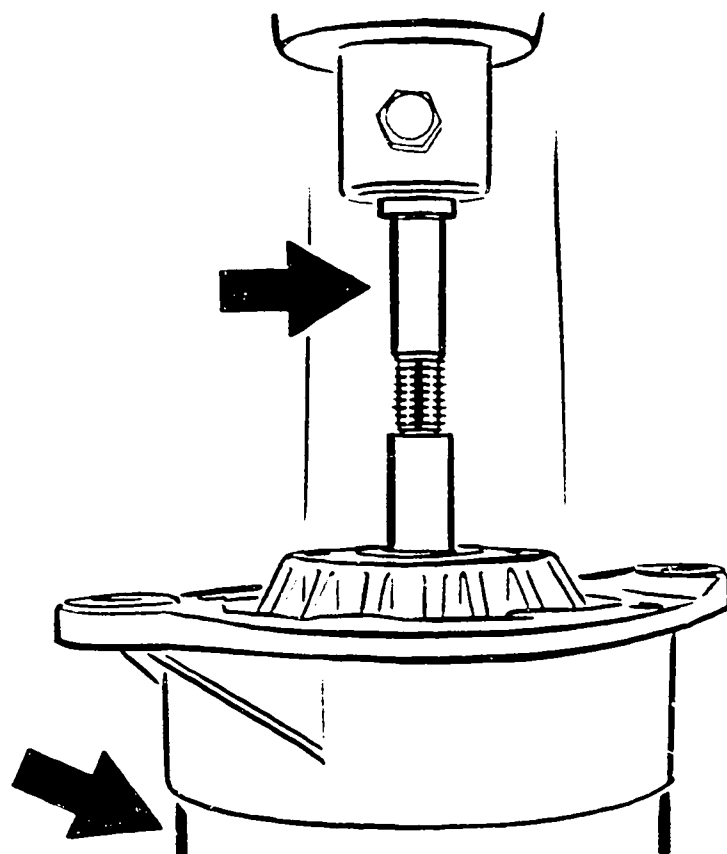
Pressing rotor without winding (windingless rotor) out of drive end shield:

Press rotor without winding (windingless rotor) out of drive end shield using mandrel press with pressing-out ring KDLJ 6022 and press-out mandrel KDLJ 6015 (arrows).

C a u t i o n :

Always renew deep-groove ball bearing whenever the rotor without winding (windingless rotor) is removed.

Continue: B18/1 Fig.: B17/2



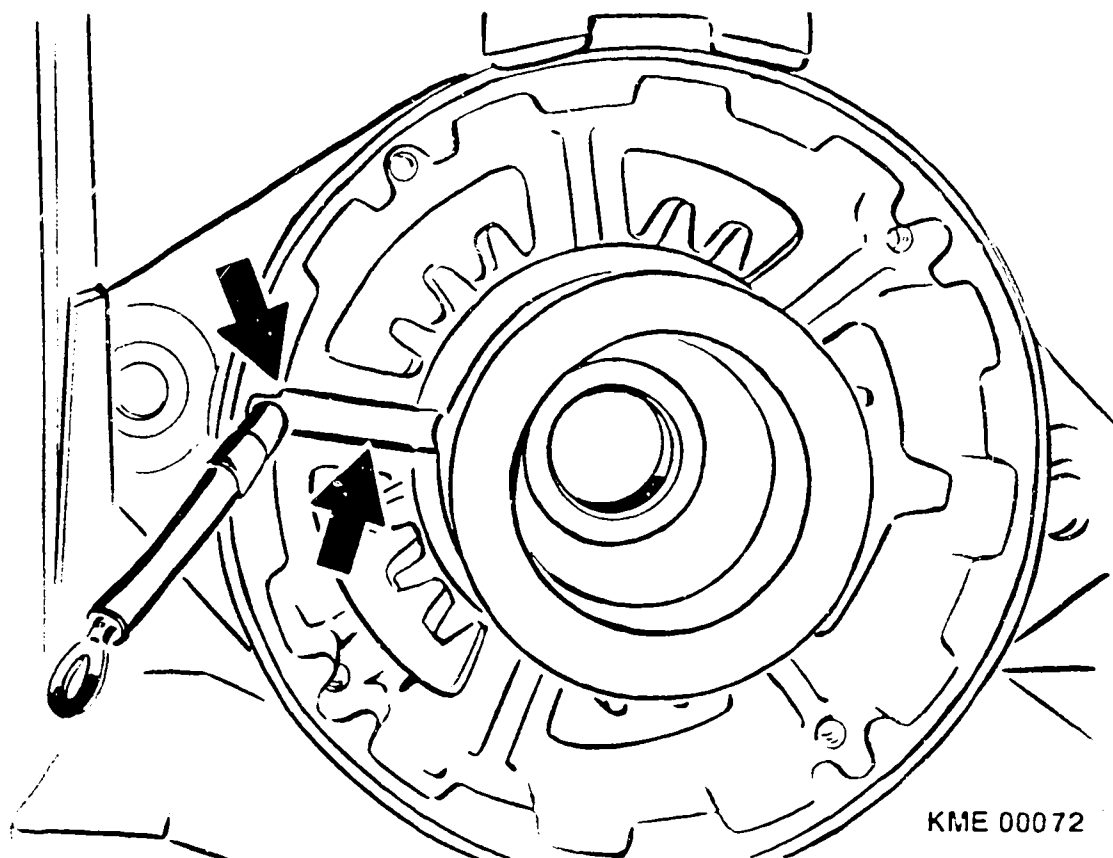
KME 00071

ALTERNATOR DISASSEMBLY

Renewing pole body with winding (excitation winding) or deep-groove ball bearing:

Before removing pole body with winding (excitation winding) or deep-groove ball bearing in drive end shield, carefully remove (using for example a small chisel) putty in groove above lead to pole core with winding (excitation winding) (arrow). Loosen six fillister-head screws on back, remove pole body with winding (excitation winding) and intermediate ring, and pull deep-groove ball bearing out of machined seat.

Continue: B19/1 Fig.: B18/2

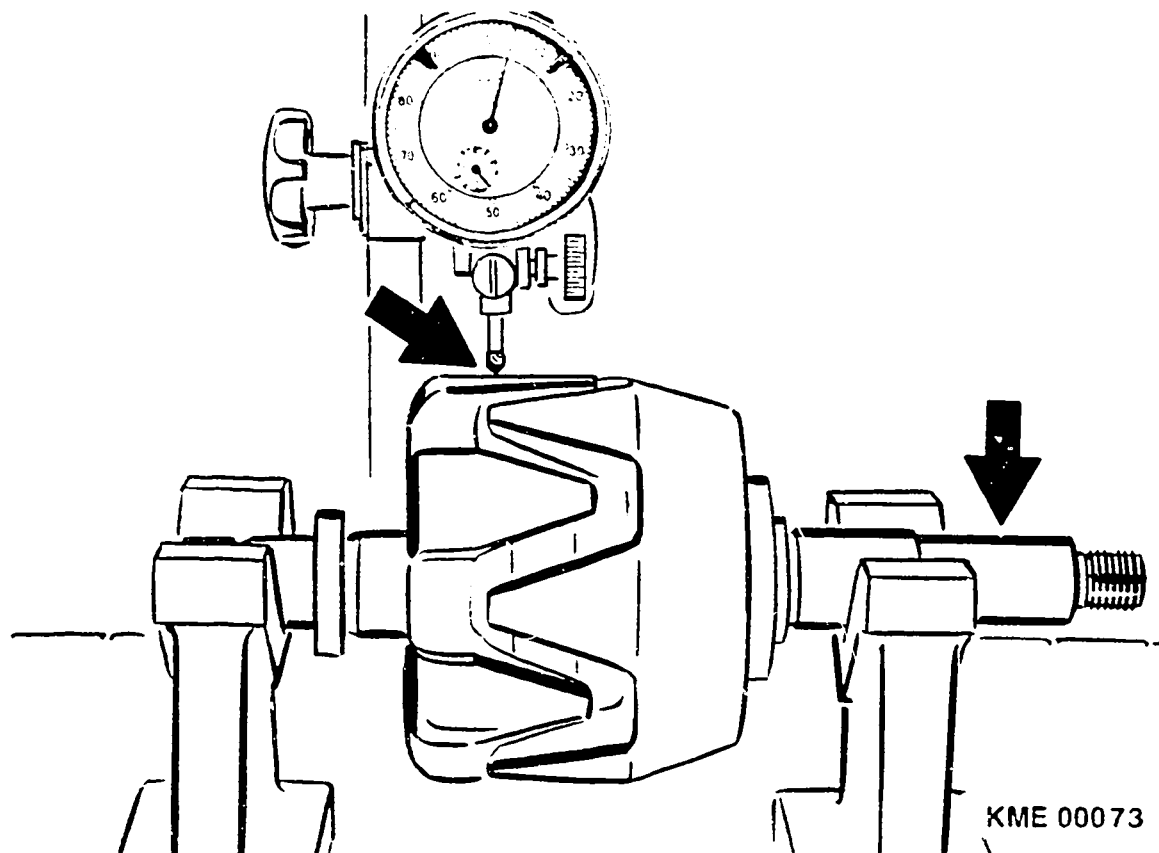


ALTERNATOR DISASSEMBLY

Concentricity measurement:

In the event of bearing damage or noise, the concentricity of the rotor without winding (windingless rotor) must be checked. Support rotor without winding at bearing points in V-blocks, align so as to be exactly horizontal and perform concentricity measurement at outside diameter of rotor without winding (windingless rotor) and at outside diameter of shaft end (pulley seat) (arrow) with magnetic stand 4 851 601 124 and dial indicator EFAW 7.

Continue: B20/1 Fig.: B19/2



ALTERNATOR DISASSEMBLY

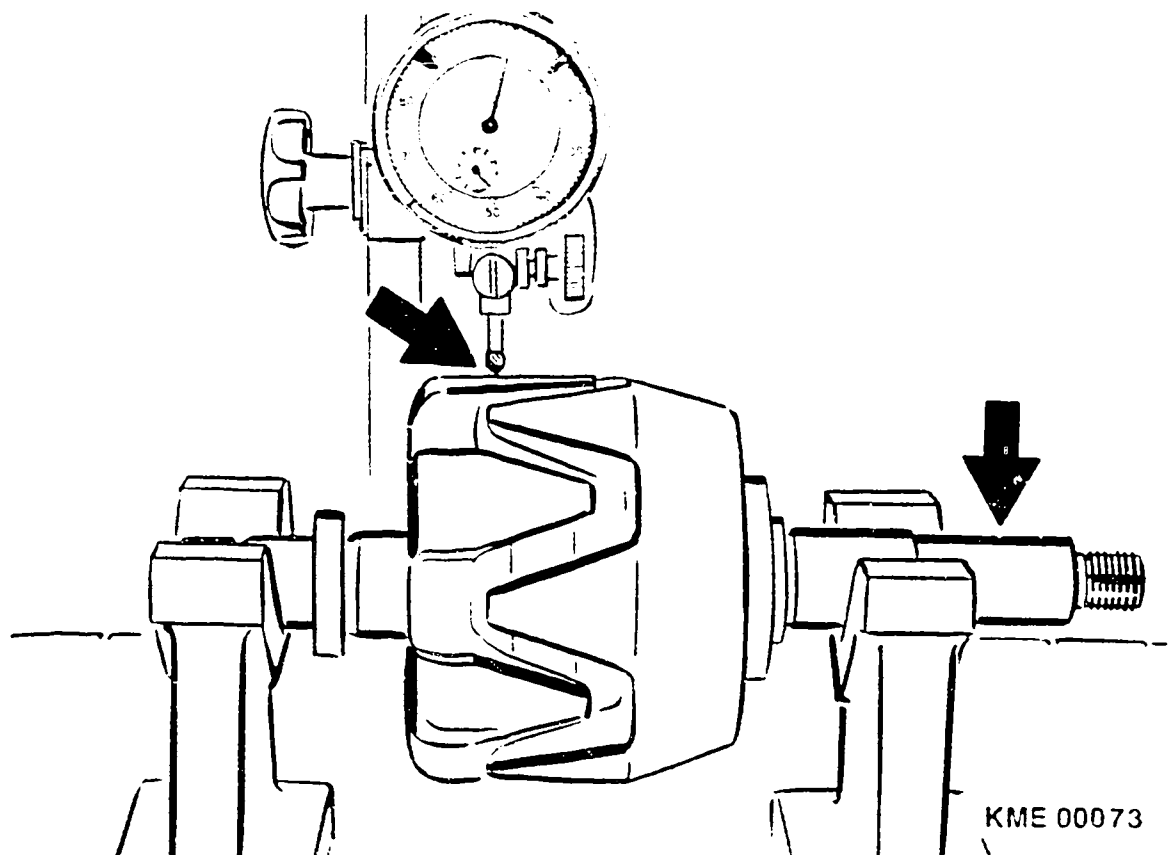
Concentricity measurement:

Permissible eccentricity at rotor without winding

Windingless rotor max. 0.05 mm

Pulley seat max. 0.03 mm.

Continue: B21/1 Fig.: B20/2



CLEANING OF PARTS

CAUTION !
DANGER OF FIRE

To provide interference suppression for receivers and transmitters, alternators are fitted with capacitors with a long storage time.

Washing out alternator components may result in capacitor discharge when immersing them in cleaning fluids. This can cause combustible liquids to catch fire.

Continue: B21/2

CLEANING OF PARTS

For this reason, parts featuring capacitors are only to be washed out in HAKU 1025/6.

Continue: B22/1

ALTERNATOR ASSEMBLY

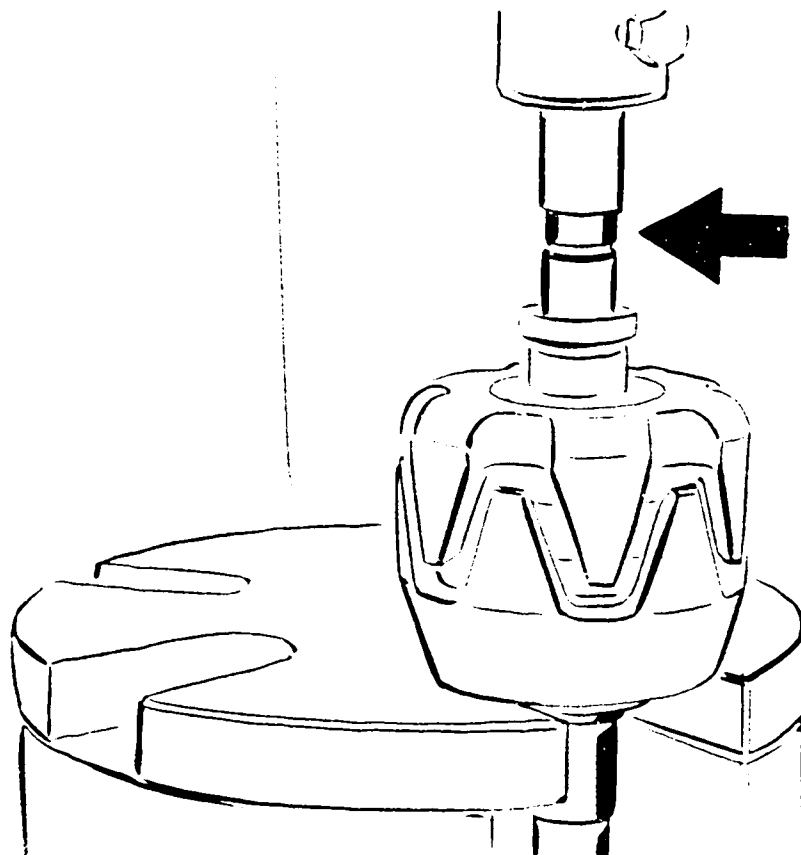
Press cylindrical-roller-bearing inner race (arrow) with pressing-on mandrel KDLJ 6002 on to shaft of rotor without winding (windingless rotor). Only fit cylindrical-roller-bearing inner race and cylindrical-roller bearing as a pair.

Press cylindrical-roller-bearing outer race as far as it will go into rectifier end shield using KDLJ 6018.

Attach inner cover ring and tighten with 3 fillister-head screws.

Tightening torque 1.1...1.4 Nm

Continue: B23/1 Fig.: B22/2



KME 00074

ALTERNATOR ASSEMBLY

Renewing connection:

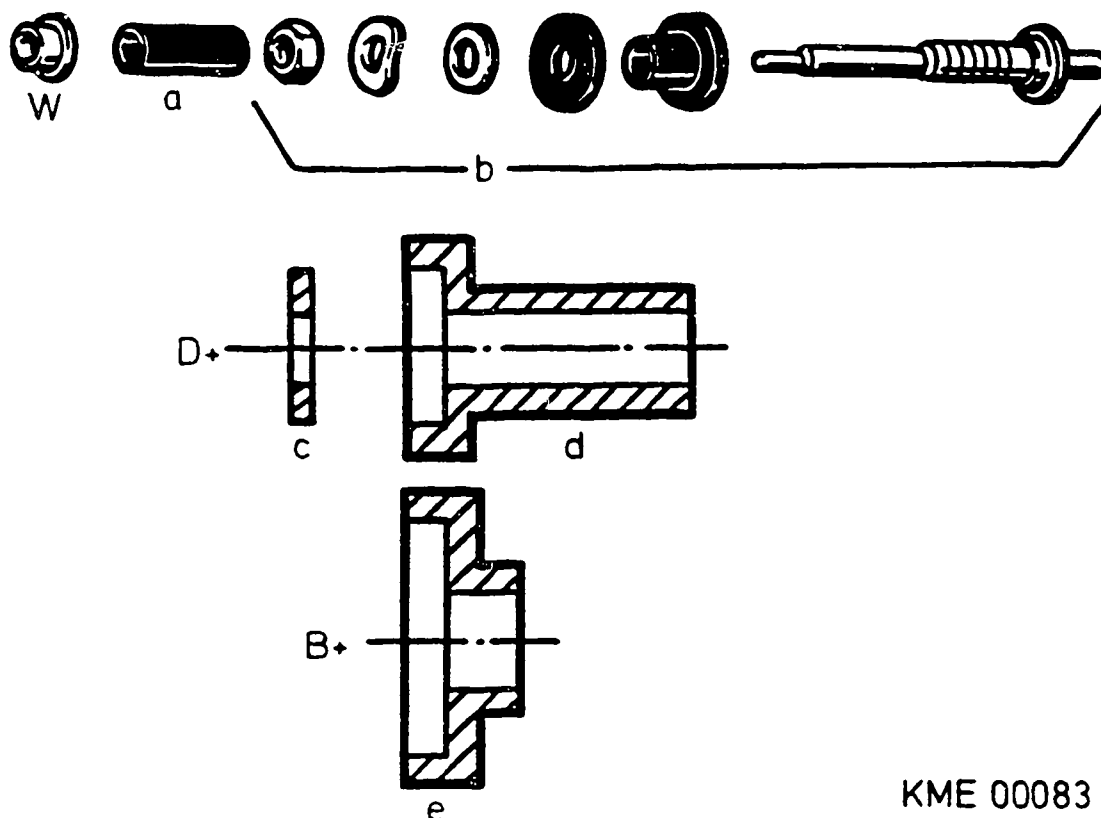
If applicable, replace damaged terminal W complete. Sequence of assembly as per "b" (refer to picture).

Tightening torque:

Bottom and top nut 2.1...2.8 Nm in each case

Slip insulation tubing "a" over assembled terminal W.

Continue: B24/1 Fig.: B23/2



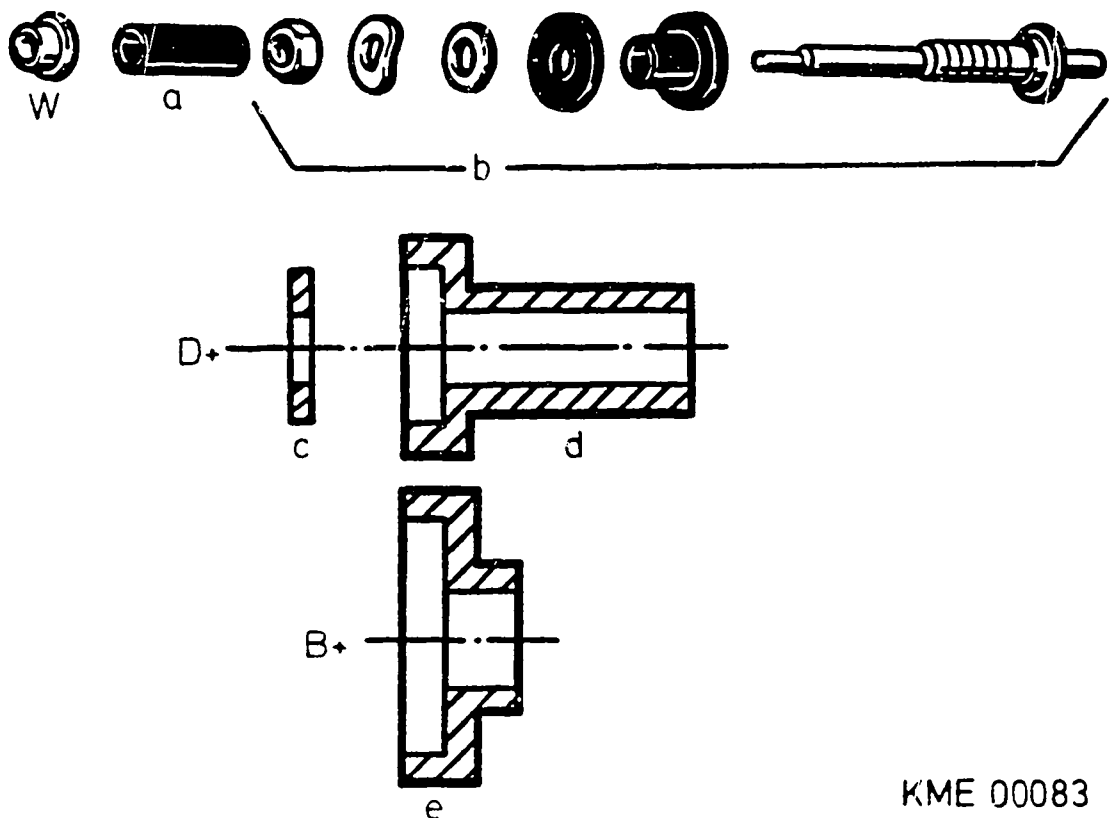
KME 00083

ALTERNATOR ASSEMBLY

Renewing connection:

Slip plain washer "c" and insulating bushing "d" over fitted D+ terminal into rectifier. Place insulating washer "e" in bushing for B+ terminal in rectifier end shield.

Continue: B25/1 Fig.: B24/2



KME 00083

ALTERNATOR ASSEMBLY

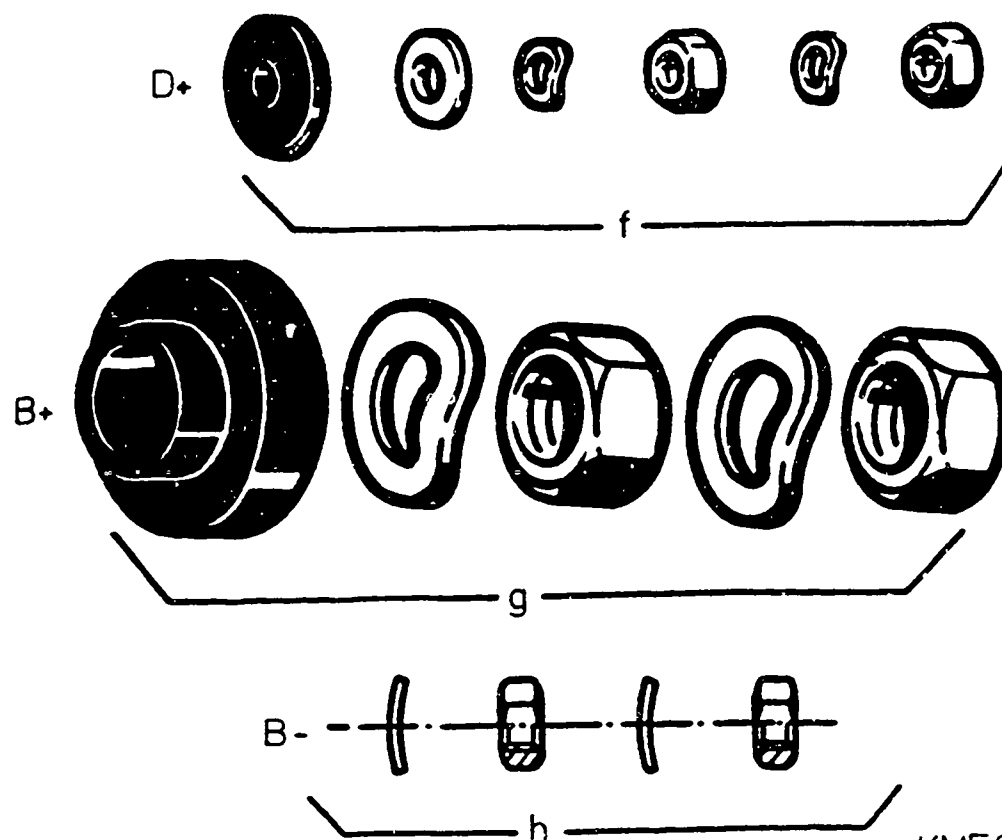
Installing rectifier:

Insert rectifier and screw on to
rectifier end shield.

Tightening torque 1.5...1.8 Nm.

Provide terminals B+, D+ and B- with
parts f, g and h on outside of
rectifier end shield and secure.

Continue: B26/1 Fig.: B25/2



KME00084

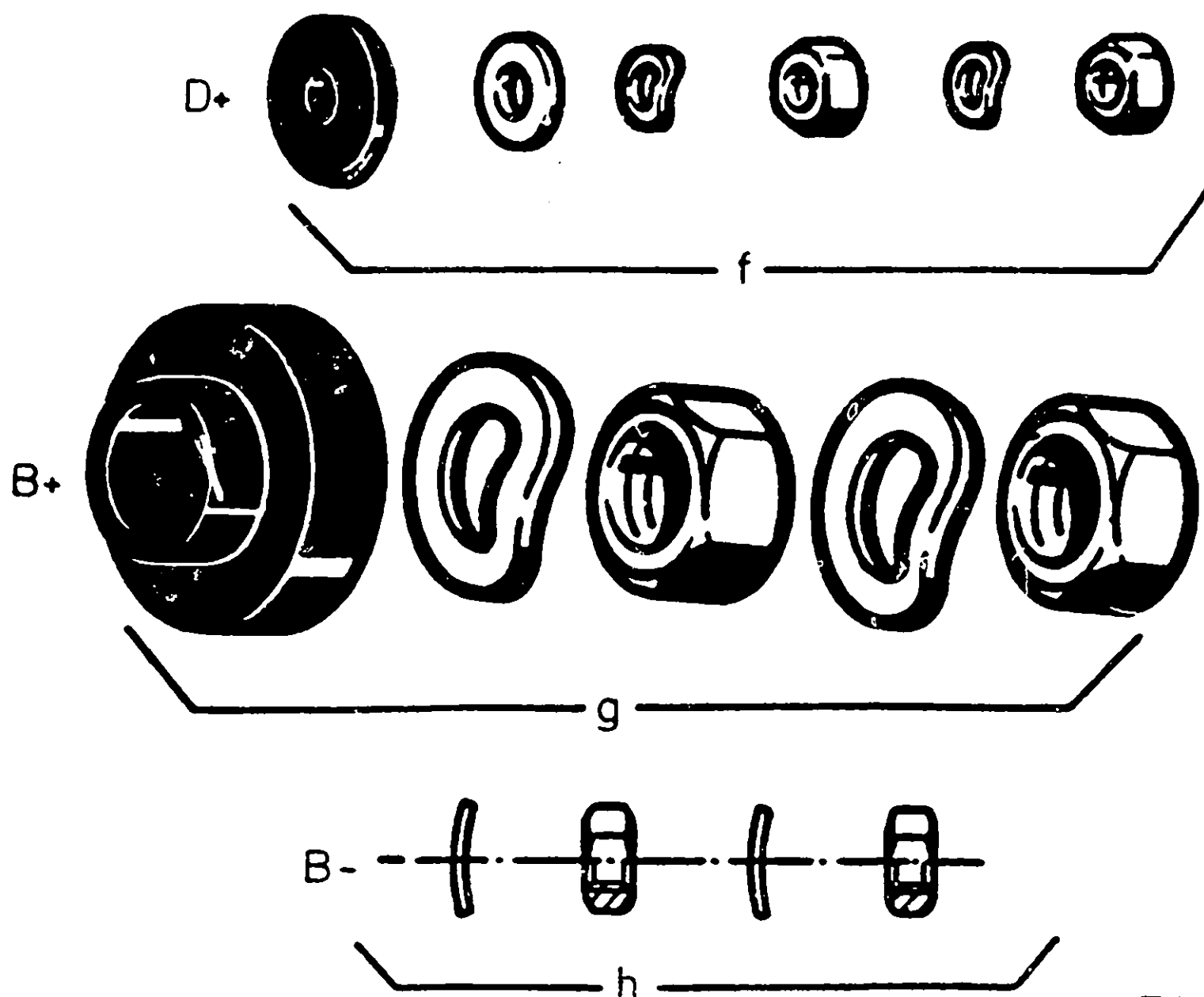
ALTERNATOR ASSEMBLY

Installing rectifier:

Tightening torques:

Terminal D+	bottom nut	1.5...1.8 Nm
	top nut	1.5...1.8 Nm
Terminal B+	bottom nut	22... 30 Nm
	top nut	7.5... 10 Nm
Terminal B-	bottom nut	2.1...2.8 Nm
	top nut	0.7...0.9 Nm

Continue: B27/1 Fig.: B26/2



KME 00084

ALTERNATOR ASSEMBLY

Installing stator:

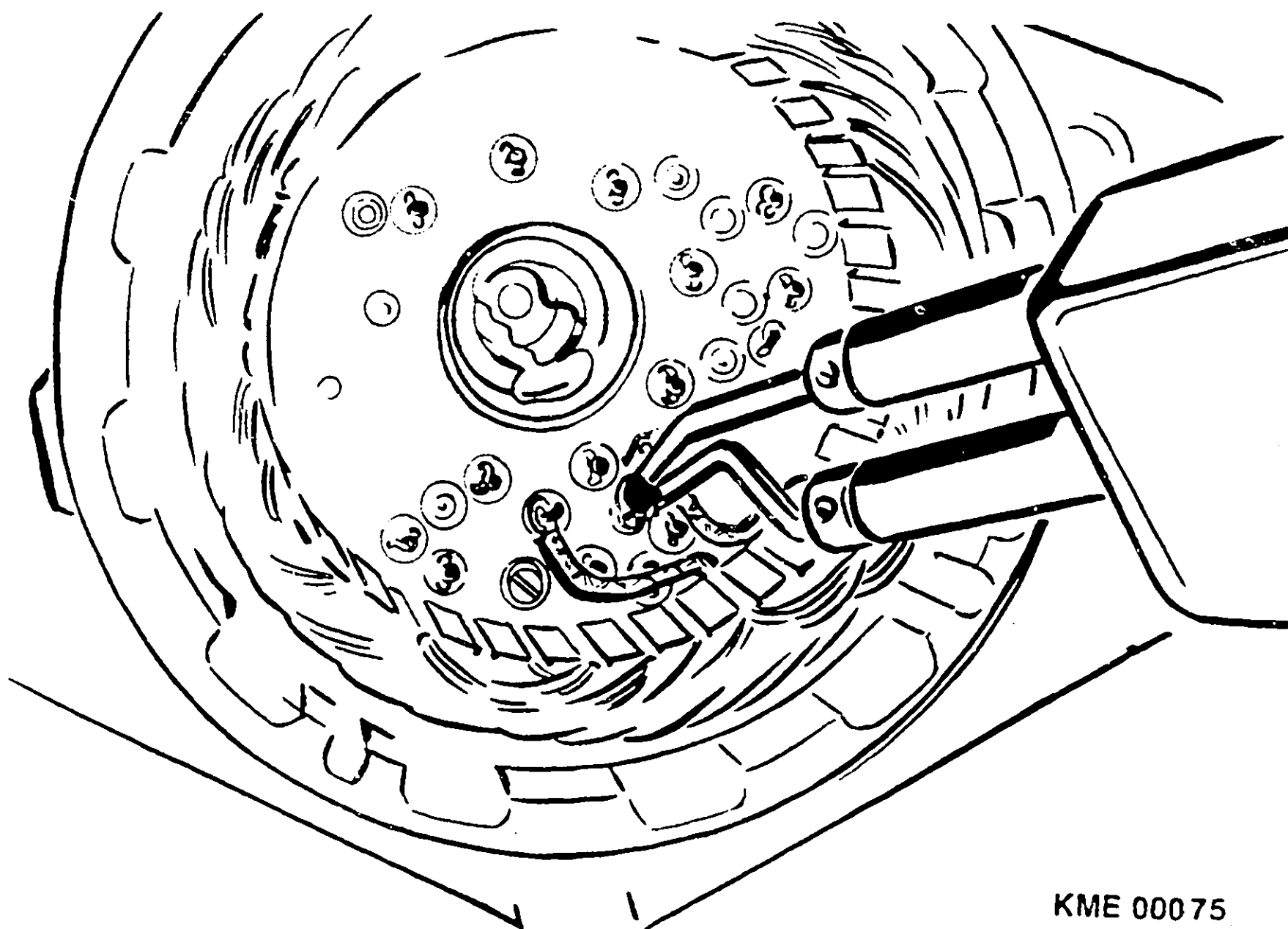
Assemble stator and rectifier end shield. Insert phase connections into eyelets on rectifier, bend over and solder on (picture).

Pay attention to alignment of grooves for 4 through-bolts!

Slip soldering sleeve over terminal "W" and solder on.

In the case of alternator 0 122 469 001, .. 002 fill cylindrical-roller bearing with at least 6...7 g (8...9 cm³) of rolling-bearing grease Ft 1 V34.

Continue: B28/1 Fig.: B28/2



KME 00075

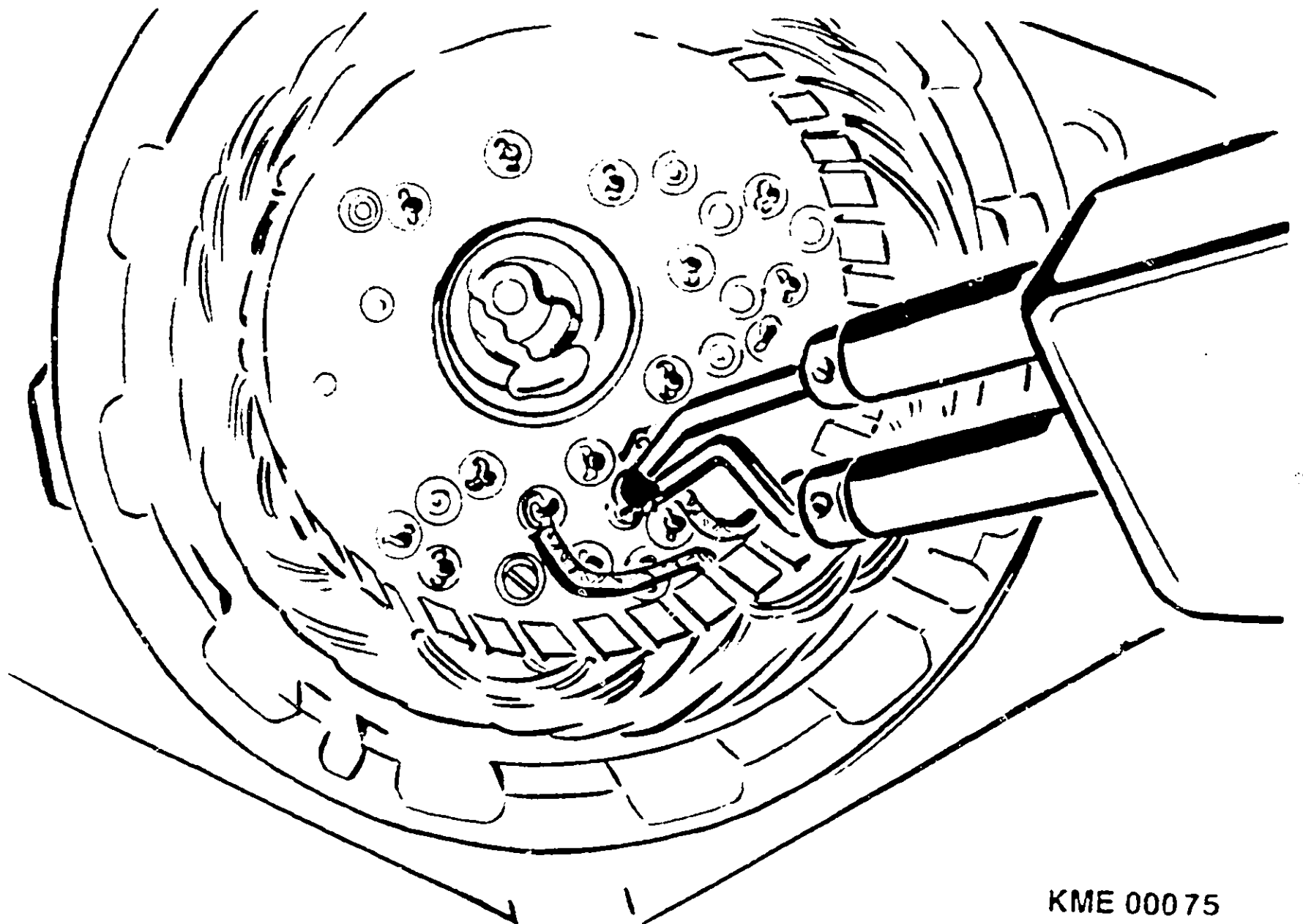
ALTERNATOR ASSEMBLY

Installing stator:

I M P O R T A N T :

In the case of alternators
0 122 469 003, .. 004, fill
cylindrical-roller bearing with at
least 6...7 g (8...9 cm³) of rolling-
bearing grease Unirex N3 (USA).

Continue: C01/1 Fig.: B28/1



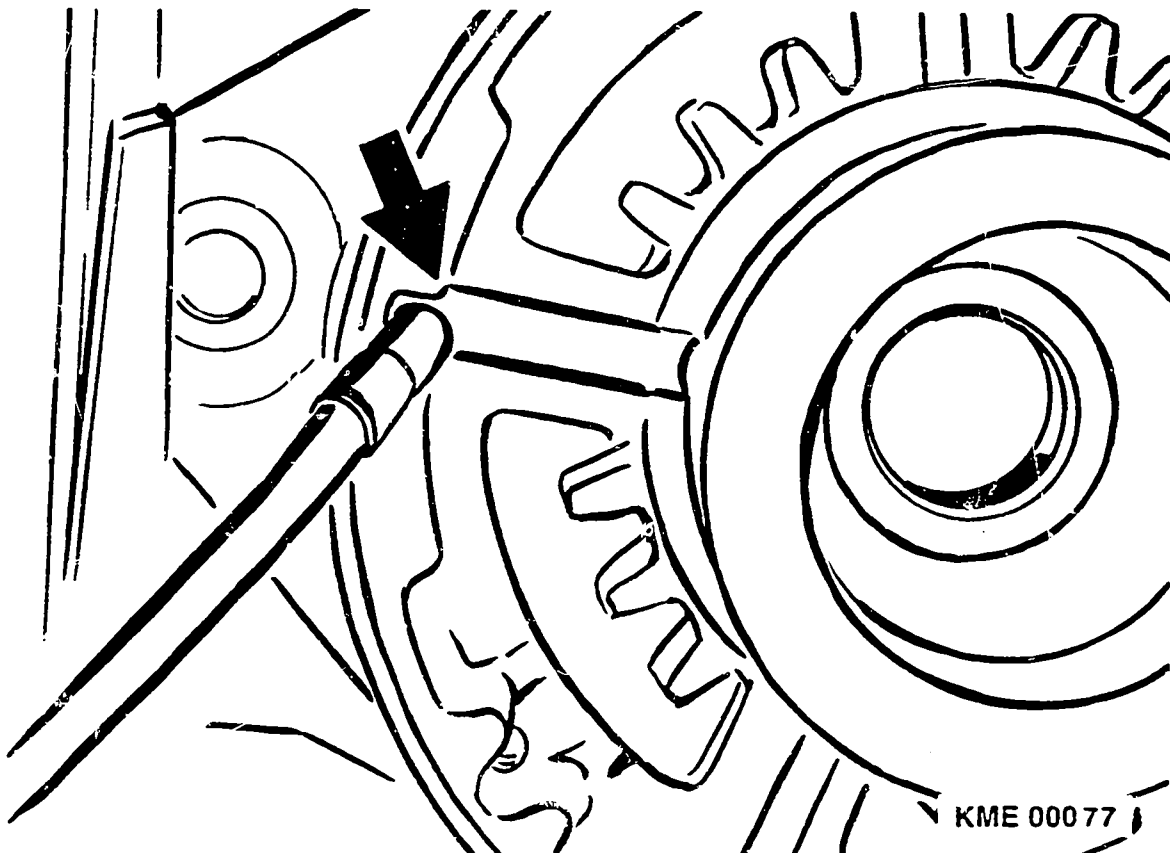
KME 00075

ALTERNATOR ASSEMBLY

Assembling drive end shield:

Insert new deep-groove ball bearing into bearing seat (sliding fit).
Insert intermediate ring between pole body with winding (excitation winding) and deep-groove ball bearing.
Install pole body with winding (excitation winding) such that leads fit in groove in drive end shield.
Screw on pole body with winding (excitation winding) using six fillister-head screws.
Tightening torque 2.1 ... 2.8 Nm

Continue: C02/1 Fig.: C01/2



ALTERNATOR ASSEMBLY

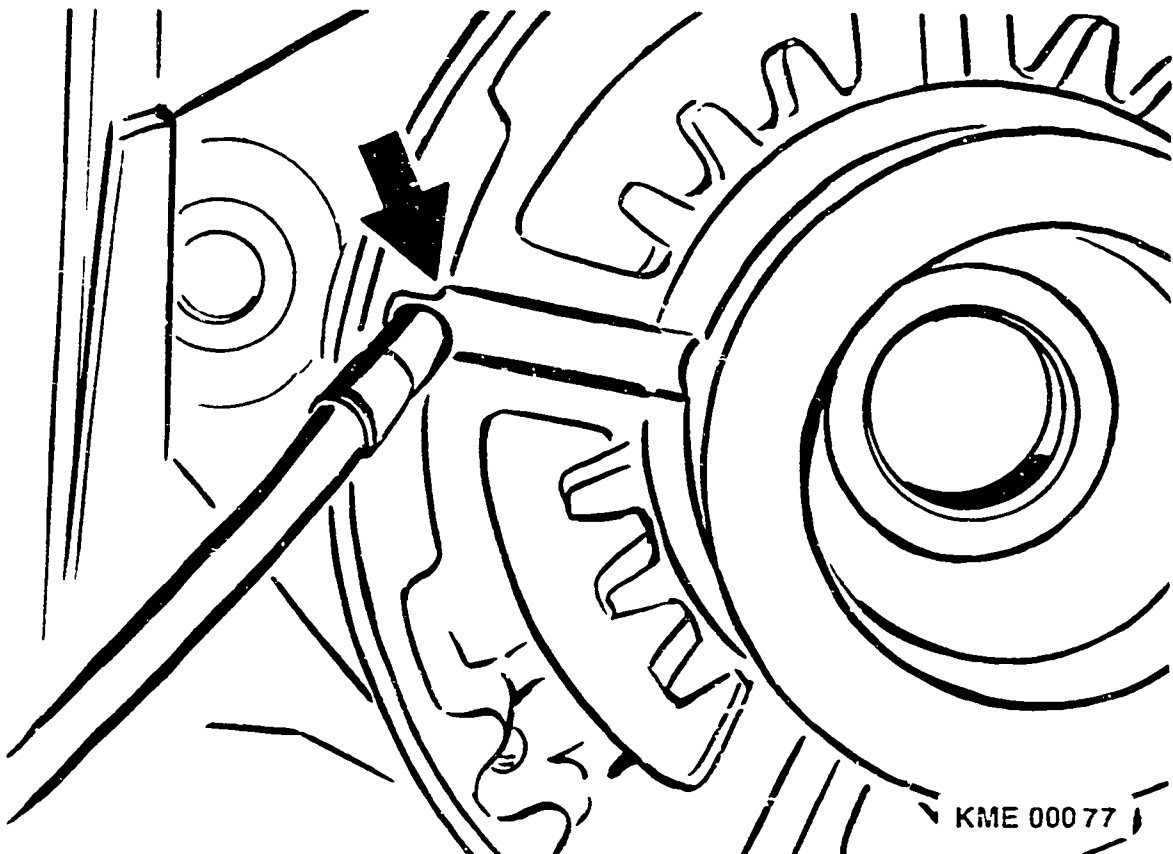
Assembling drive end shield:

Use putty to position lead of pole body with winding (excitation winding) in kink (picture, arrow).

I m p o r t a n t :

People subject to allergies may suffer irritation of the skin if their fingers come into contact with the putty. Suitable skin cream is thus to be applied before starting work and after cleaning hands.

Continue: C03/1 Fig.: C02/2



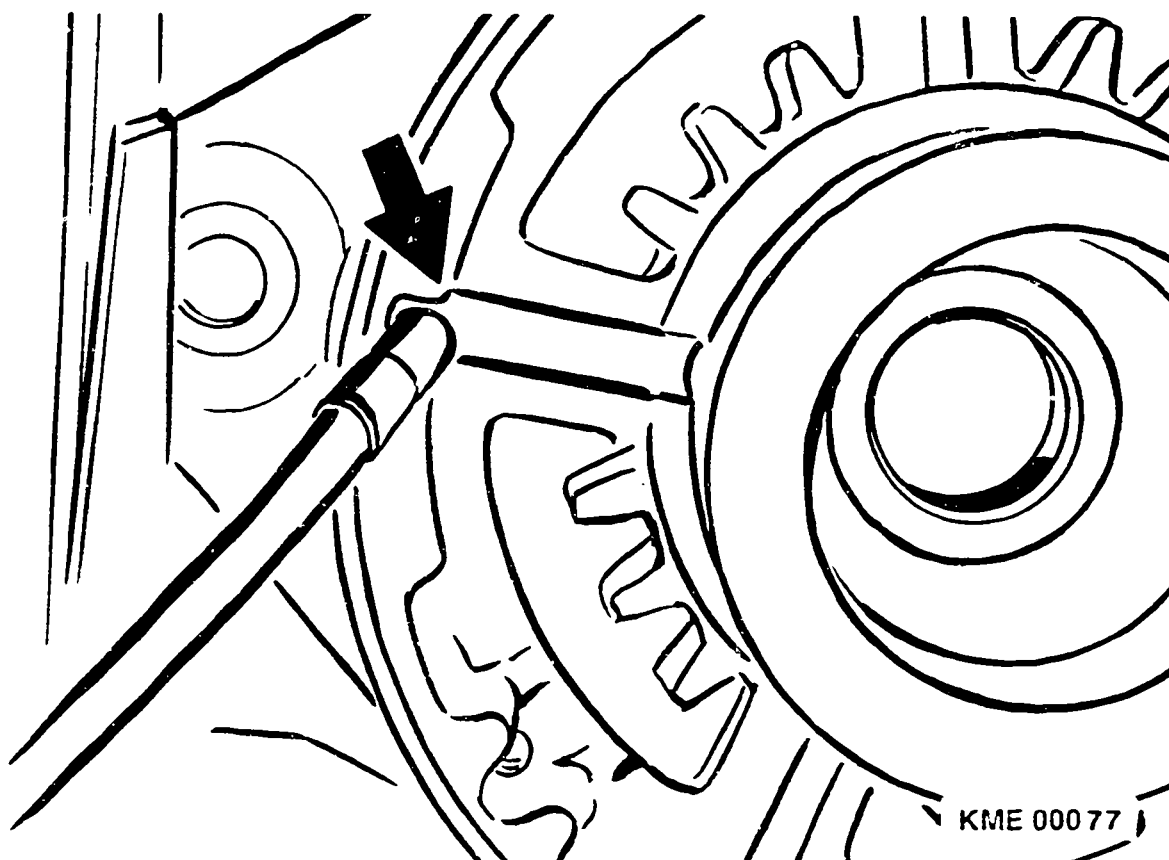
ALTERNATOR ASSEMBLY

Assembling drive end shield:

Mix both putty components in a 1:1 ratio. Form a ball with a diameter of approximately 1 cm by kneading the putty. The color must be a consistent green. Blue and yellow inclusions should no longer be present after kneading.

Fill remaining joint as far as pole body with Elastosil.

Continue: C04/1 Fig.: C03/2



ALTERNATOR ASSEMBLY

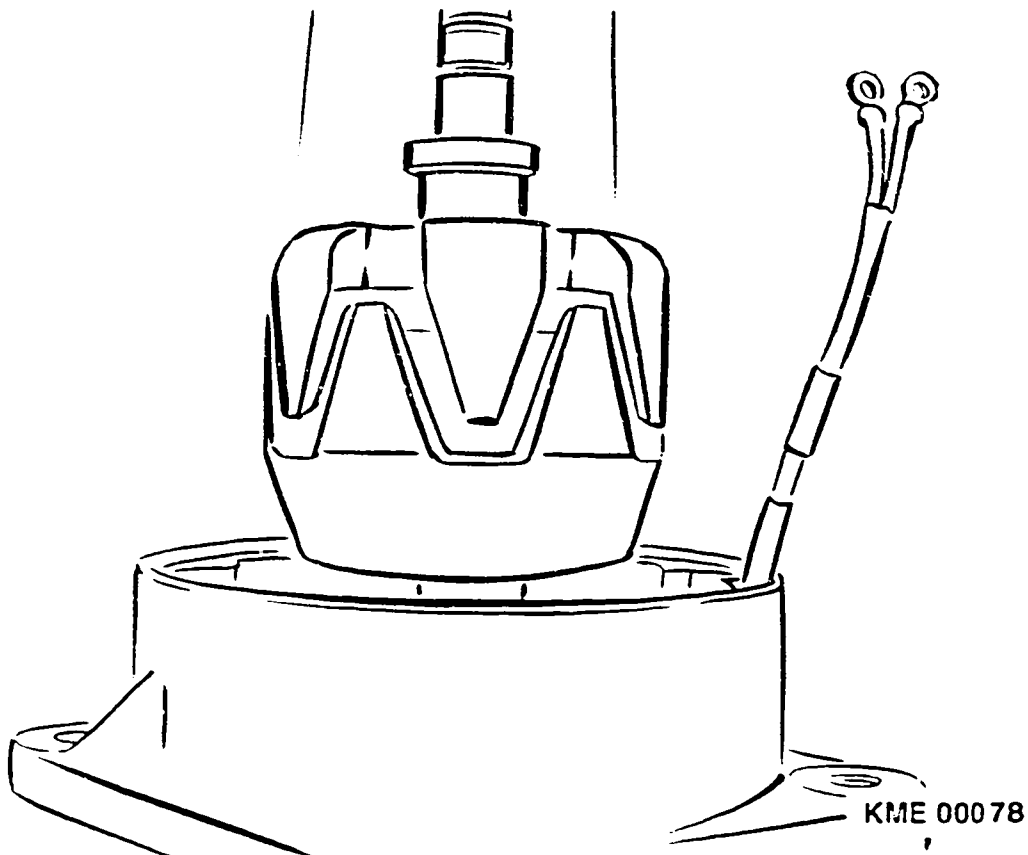
Installing rotor without winding
(windingless rotor):

Insert spacer ring on outside of drive
end shield.

Collar faces inner race of deep-groove
ball bearing.

Use mandrel press to press rotor
without winding (windingless rotor) as
far as it will go into drive end
shield.

Continue: C05/1 Fig.: C04/2



ALTERNATOR ASSEMBLY

Attaching regulator:

Screw leads from pole body with winding (excitation winding) and D+ lead of rectifier back on to regulator. Leads cannot be mixed up since screw diameter is different.

M4 two leads (picture, item 1)

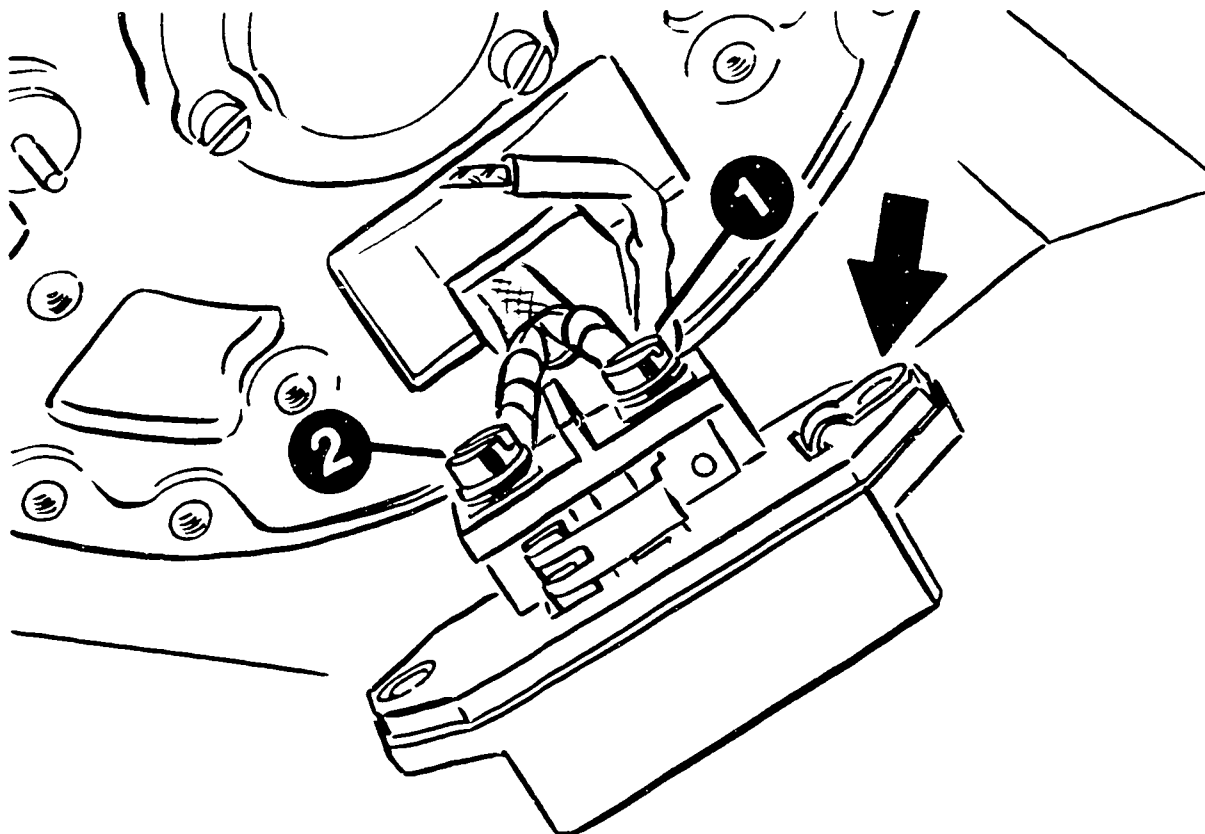
M5 one lead (picture, item 2)

Tightening torques:

M4 1.5...1.8 Nm

M5 2.1...2.8 Nm

Continue: C06/1 Fig.: C05/1



KME 000 76

ALTERNATOR ASSEMBLY

Caution: Pay attention to installation position of regulator.

Install regulator in rectifier end shield such that ground connection is on capacitor attachment side (picture, arrow).

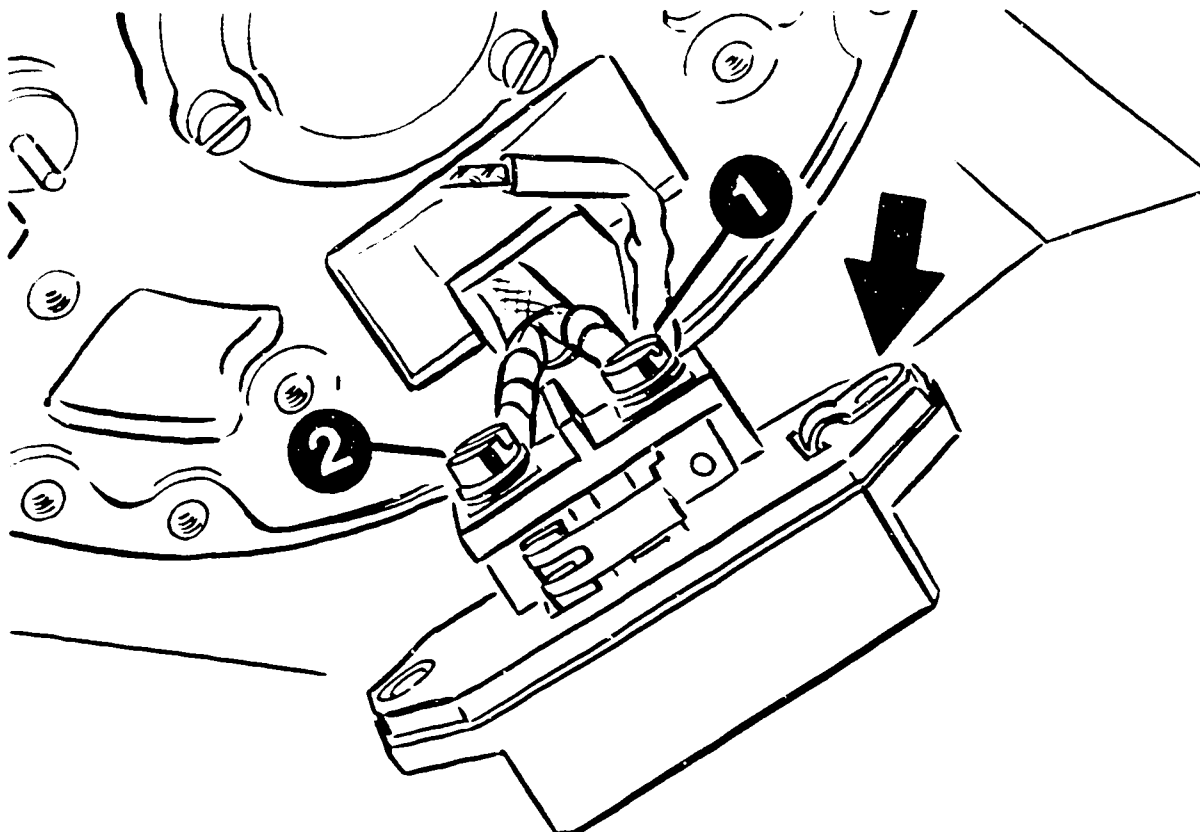
Screw regulator to rectifier end shield with two fillister-head screws.

Tightening torque 1,5...1,8 Nm

Fit closing cover, screw on with two fillister-head screws.

Tightening torque 2,3...3,0 Nm

Continue: C07/1 Fig.: C06/2



KME 000 76

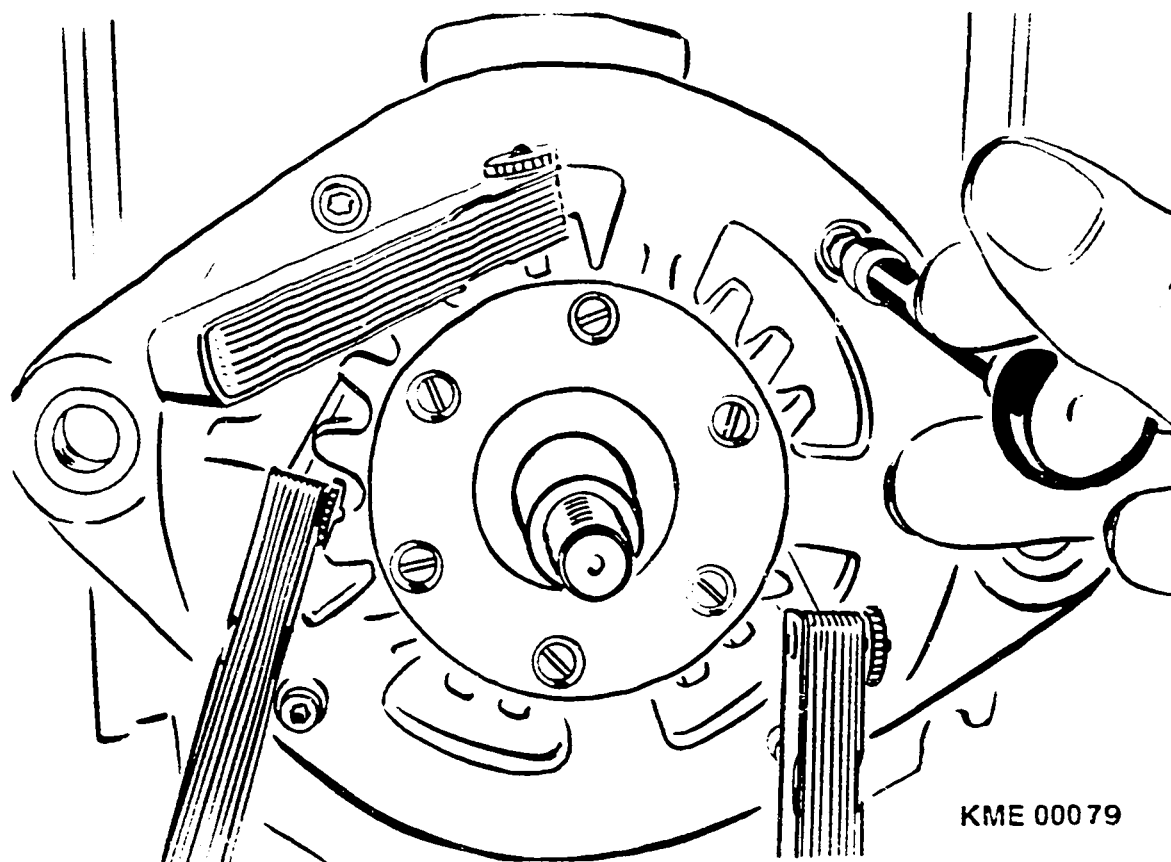
ALTERNATOR ASSEMBLY

Final assembly of alternator:

To achieve a uniform air gap around the rotor without winding (windingless rotor), insert three 0.3 mm feeler gauges between rotor without winding (windingless rotor) and stator on assembly (see picture). At the same time, align fastening eyelets of drive end shield and rectifier end shield with self-produced mandrel.

Tighten hexagon-socket-head cap screws.
Tightening torque 4,1...5,5 Nm

Continue: C08/1 Fig.: C07/2



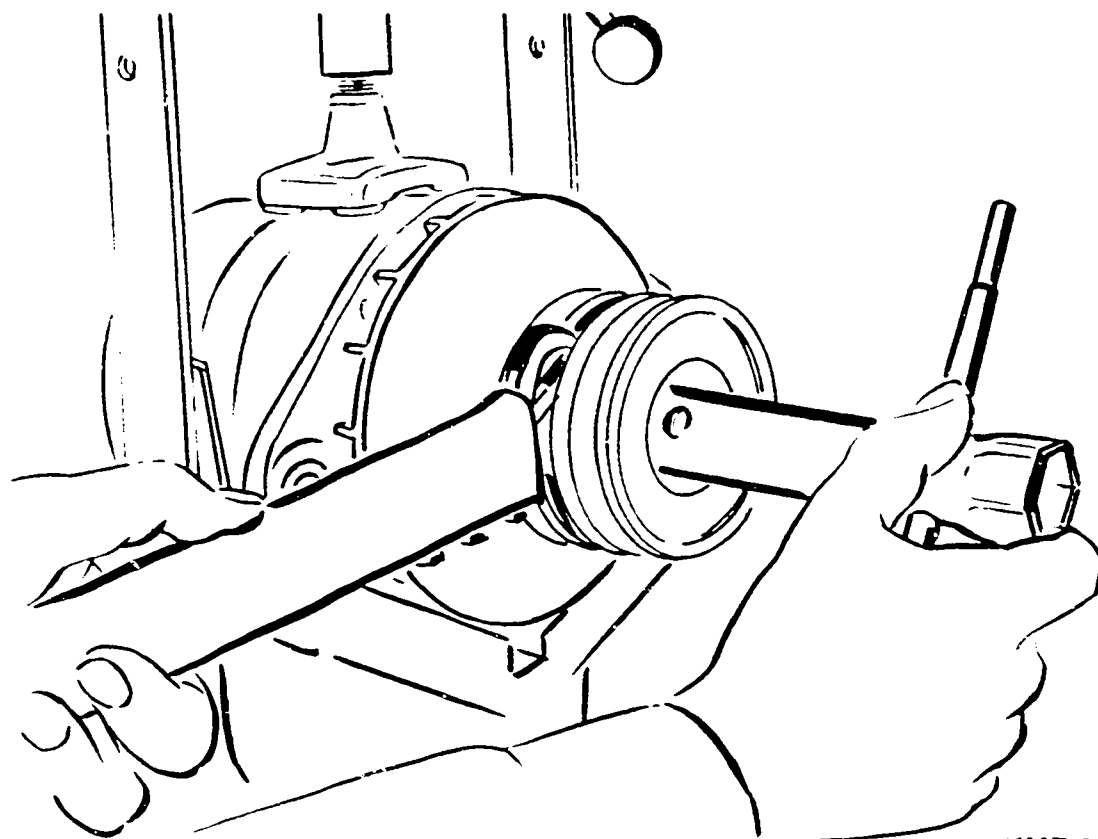
ALTERNATOR ASSEMBLY

Final assembly of alternator:

Insert Woodruff key in groove. Slip
NEW fan on to shaft on correct side.
Attach pulley components.
Secure pulley using 24 mm socket
wrench and securing device KDLJ 6006.

Tightening torque 95 ... 112 Nm

Continue: C09/1 Fig.: C08/2



KME 00064

TESTING ALTERNATOR WITH REGULATOR ON
TEST BENCH

Testers and devices:

Alternator test bench

	EFLJ 91	0 683 300 100
or	EFLJ 25..	0 680 110 ..
or	EFLJ 70 A	0 680 104 ..

or combination test bench

(only for loading up to max. 43 A)

EFAW 275..	0 681 107 ..
------------	--------------

Continue: C09/2

TESTING ALTERNATOR WITH REGULATOR ON
TEST BENCH

Testers and devices:

Mounting plate

EFLJ 66/3

for clamping alternators with hinge
mounting onto alternator test bench

EFLJ 25, 70

Parts set

1 687 000 042

for clamping alternators with hinge
mounting onto combination test bench

EFAW 275 ..

Continue: C10/1

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Testers and devices:

Alternator

Tester WPG 012.00 0 681 101 403

For additional check or test:

Ignition oscilloscope (all versions)

or

Bosch engine tester (all versions)

Continue: C10/2

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Clamp alternator into position on test bench:

Alternators with swivel arm or flange mount are only to be clamped on using the appropriate clamping fixture.

To ensure power output of test-bench engine is sufficient, only perform tests with suitable fan pulley.

Be sure to select correct transmission ratio.

Continue: C11/1

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Clamp alternator in position on test bench:

N o t e :

If, in the event of extremely high alternator power, the drive power of the test bench engine is not sufficient, then only perform test to the extent that the test speed does not drop off at the required test current.

The charge indicator lamp must be completely off during the power-output test.

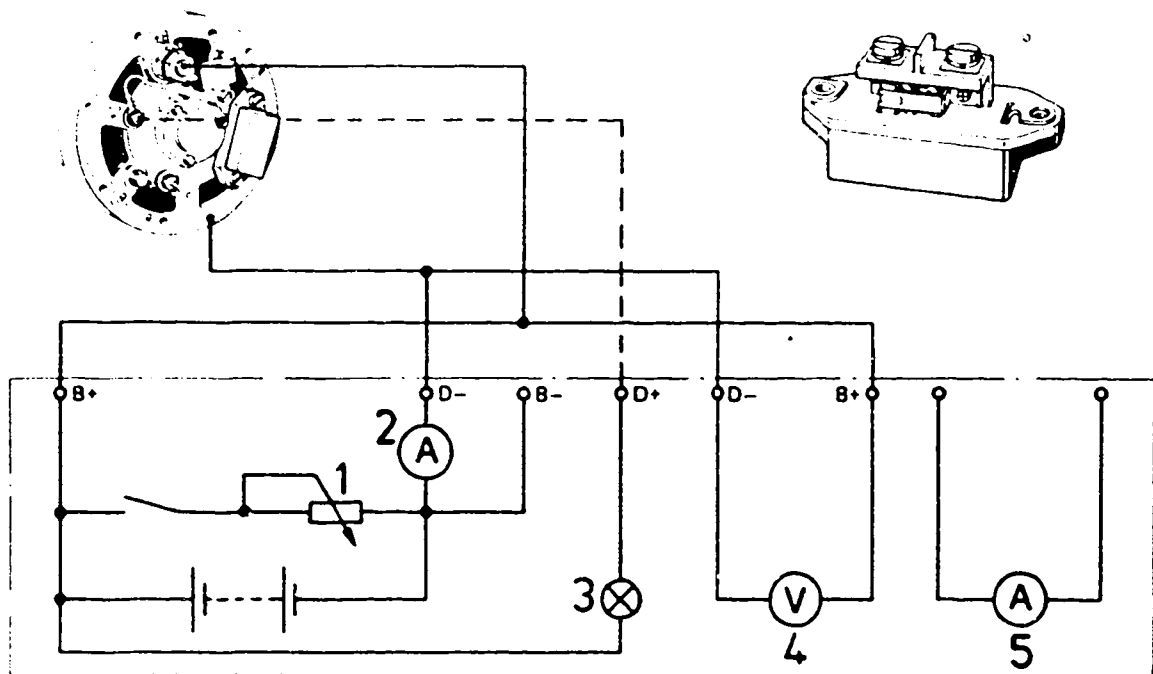
Continue: C12/1

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Terminal diagram for EE regulator
0 192 052 010.

- 1 = Load resistor
- 2 = Amp tester
- 3 = Indicator lamp
- 4 = Voltage tester (regulated voltage)
- 5 = Amp tester
- 6 = Test-bench battery

Continue: C13/1 Fig.: C12/2

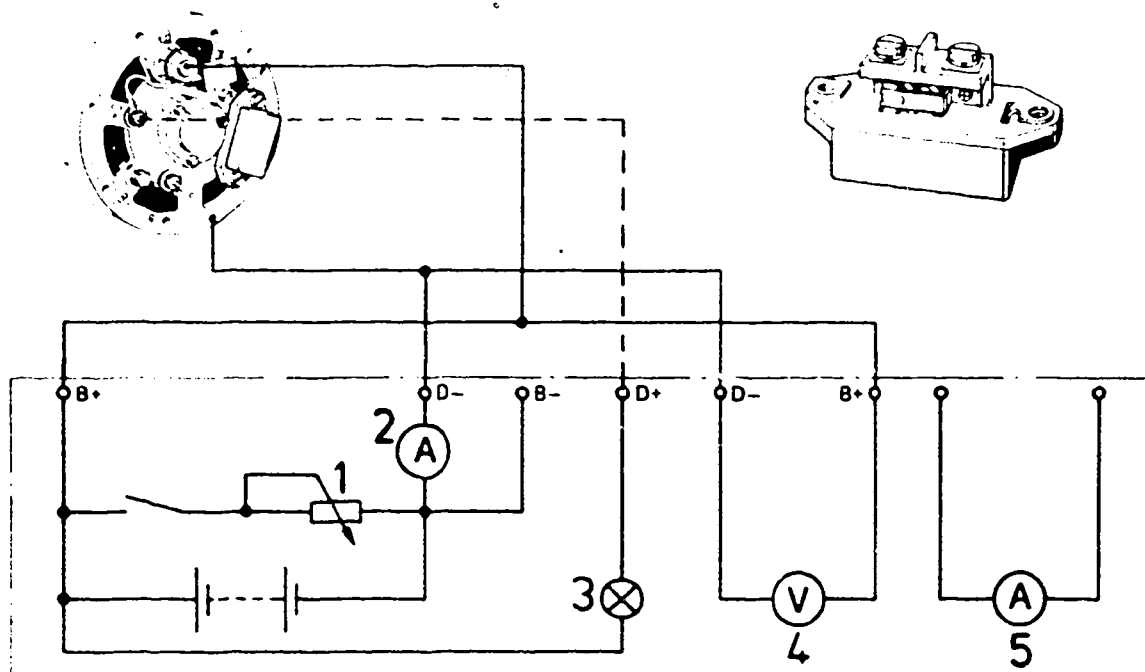


TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Connection of alternator to test bench:
Connect battery positive lead of test bench to B+ of alternator.

If clamping table on test bench is used as ground lead, make sure that no contact resistances are produced.
In the case of high-power alternators, it is advantageous to connect the battery negative lead of the test bench directly to the alternator.
Connect up voltage tester between B+ and B-.

Continue: C14/1 Fig.: C13/2



KME 00093

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

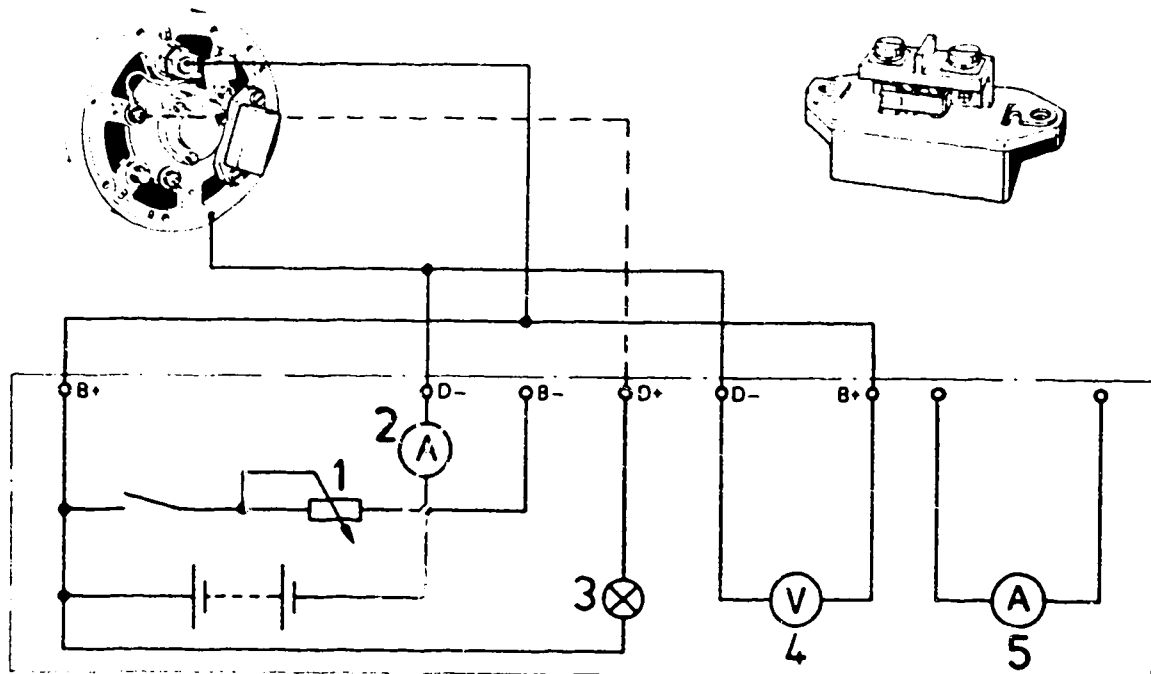
Pay particular attention to the following:

All connections at test bench must be in perfect condition.

When alternator is running, the connection between the alternator and battery must not be detached, as otherwise the semiconductors in the alternator and regulator might be destroyed.

Never operate alternator without connected battery. If a direction of rotation is indicated on the fan pulley or on the alternator, then the alternator is only to be operated in this direction of rotation.

Continue: C15/1 Fig.: C14/2



KME 00093

TESTING ALTERNATOR WITH REGULATOR ON TEST BENCH

Power-output test with regulator:

N o t e :

When performing power-output test, ensure that current-limiting resistor installed in test bench is not switched into circuit, as otherwise the charge indicator lamp glows and simulates a fault in the alternator.

Keep the alternator voltage of 26 V constant by varying the load current I_L .

Continue: C15/2

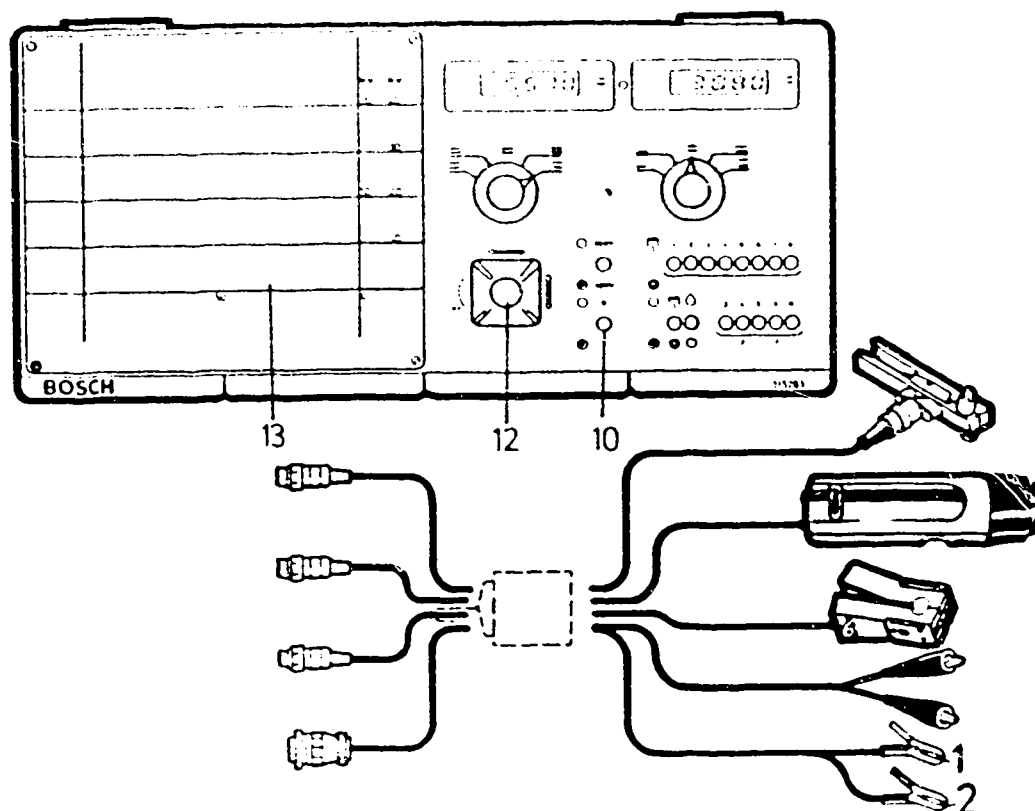
TESTING WITH OSCILLOSCOPE

Connect oscilloscope (MOT 002.00) to alternator by way of appropriate test lead.

Red terminal (1) to D+ connection.

Black terminal (2) to B- connection (ground).

Continue: C17/1 Fig.: C16/2



SETTING AND EVALUATING OSCILLOGRAM

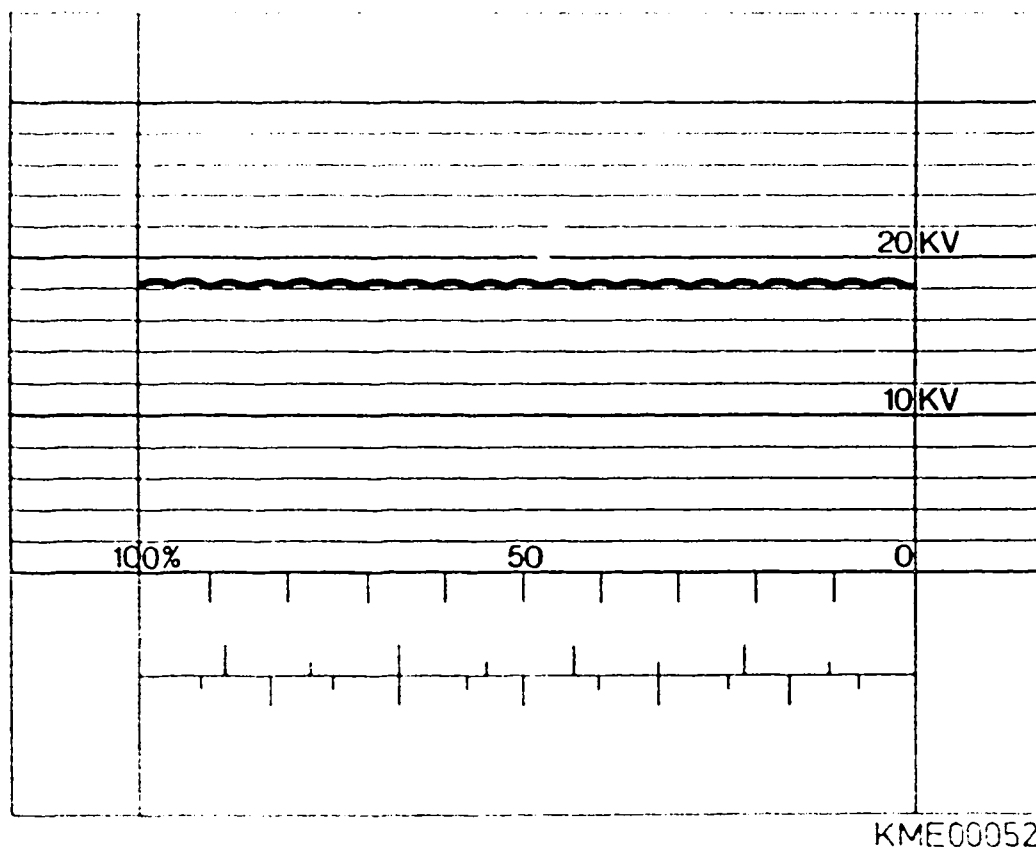
This is the image shown by an alternator which is in perfect working condition.

The D.C. voltage supplied has a low harmonic content.

Small spikes may be superimposed on the oscillogram indicated if the alternator regulator is in operation.

The regulator can be shut down by connecting up a load (e.g. load resistor).

Continue: C18/1 Fig.: C17/2

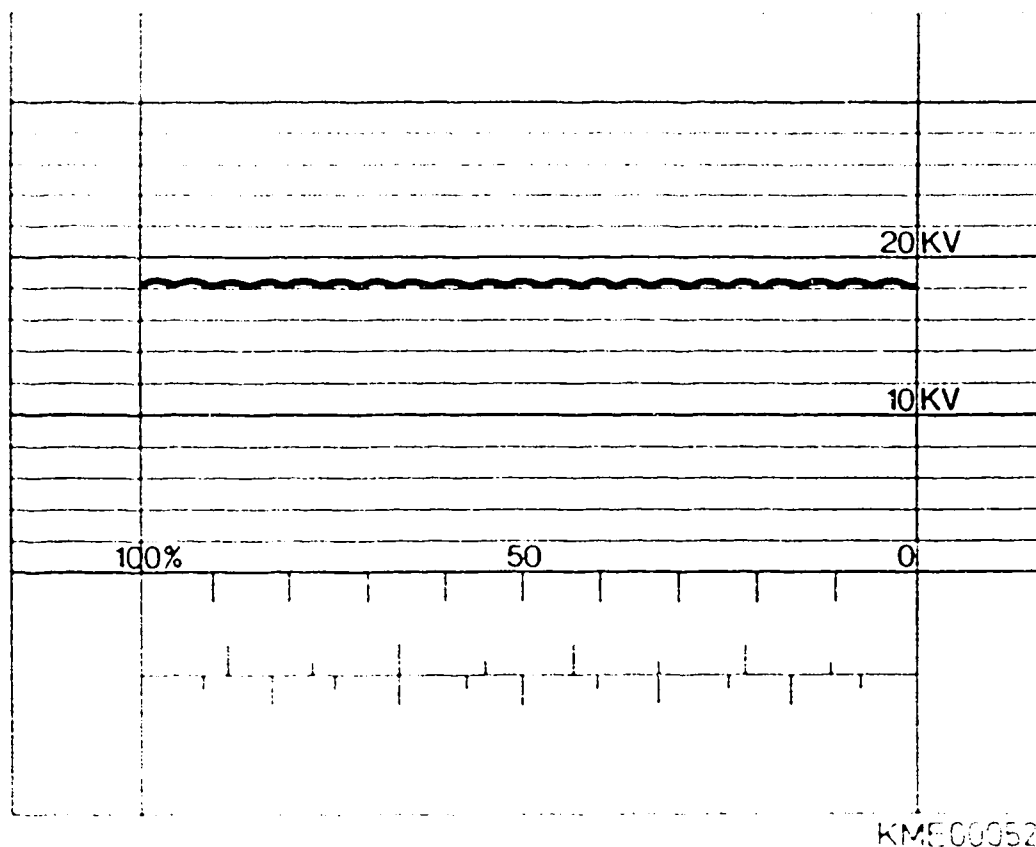


SETTING AND EVALUATING OSCILLOGRAM

In order to be able to compare such images, the respective image is to be adjusted at the oscilloscope vertical control such that it approximately fits in between the 10 and 20 kV division.

N o t e : Several faults can occur together.

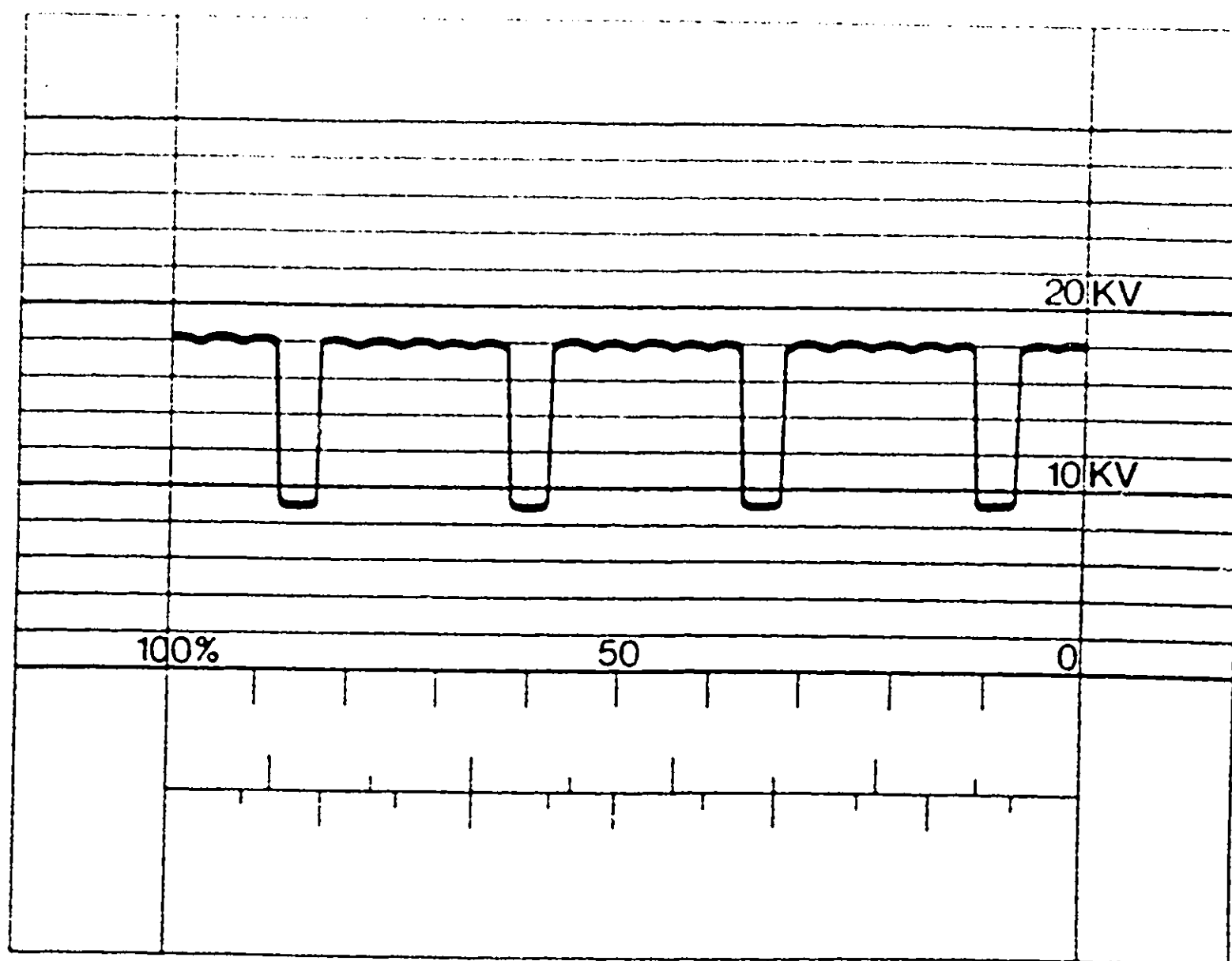
Continue: C19/1 Fig.: C18/2



SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows open-circuit in exciter diode.

Continue: C20/1 Fig.: C19/2



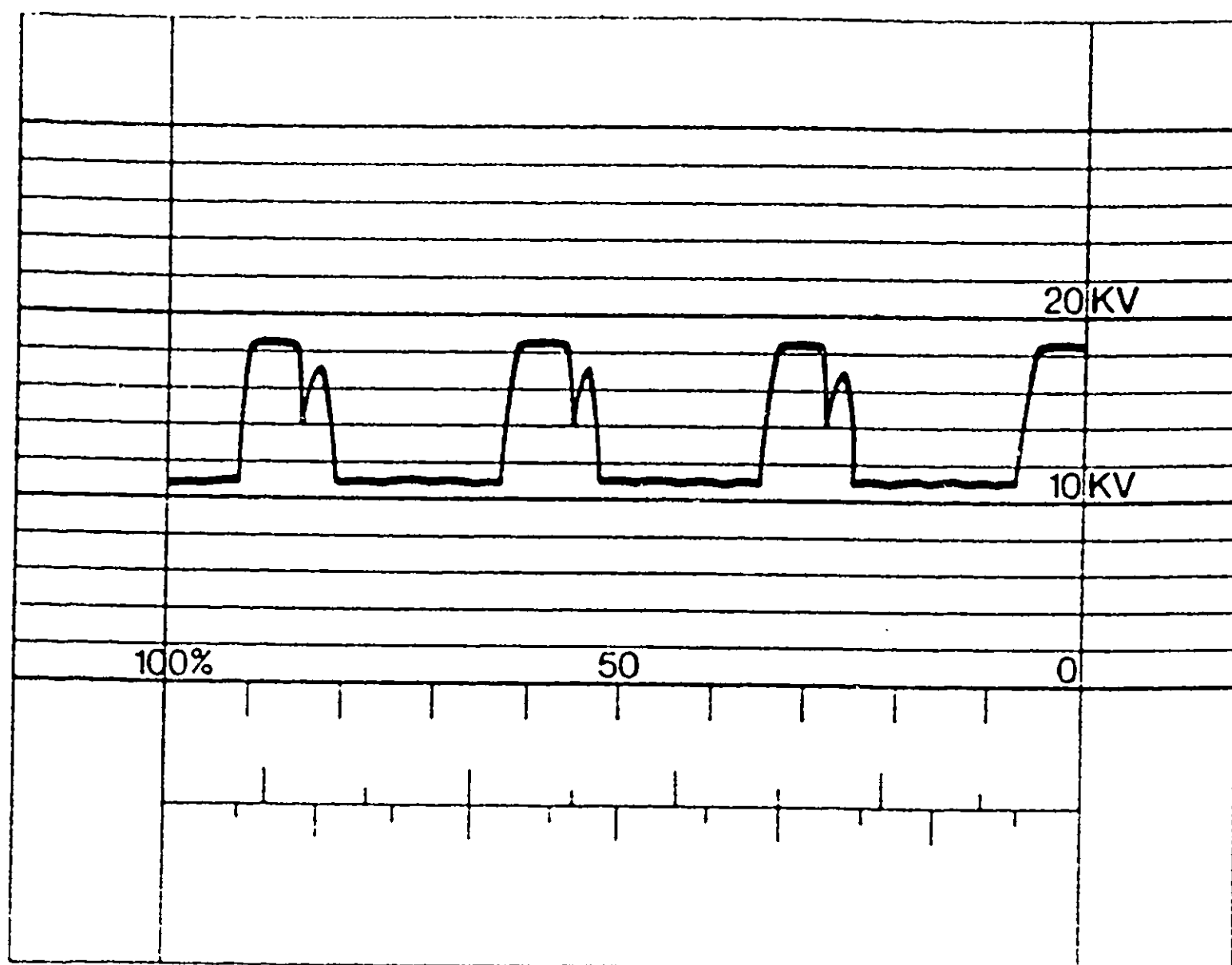
KME00053

SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows open-circuit in positive diode.

If several diodes are connected in parallel on an alternator, this oscillogram appears only if there is an open-circuit in all diodes.

Continue: C21/1 Fig.: C20/2



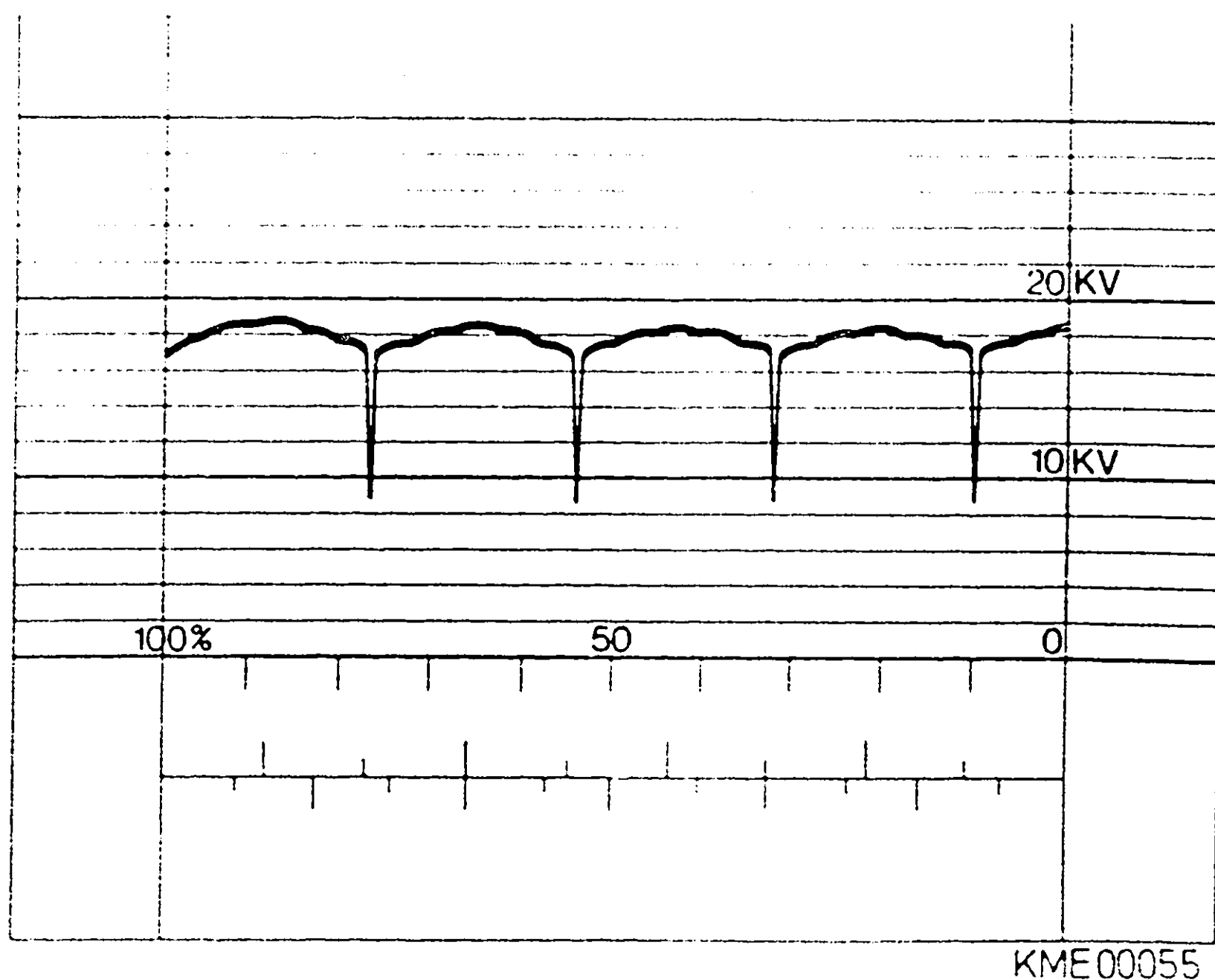
KME00054

SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows open-circuit in negative diode.

If several diodes are connected in parallel on an alternator, this oscillogram appears only if there is an open-circuit in all diodes.

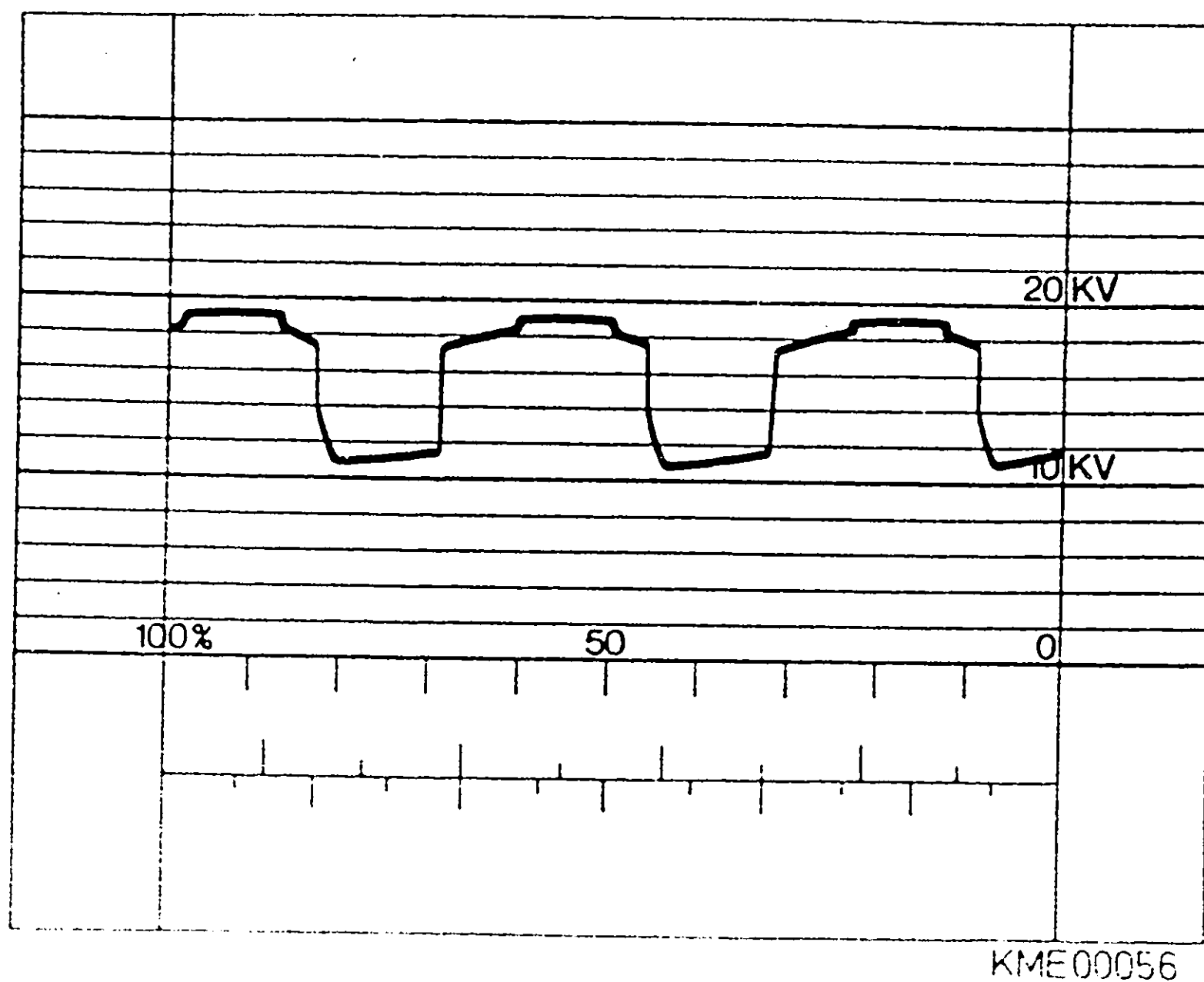
Continue: C22/1 Fig.: C21/2



SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows short-circuit in exciter diode.

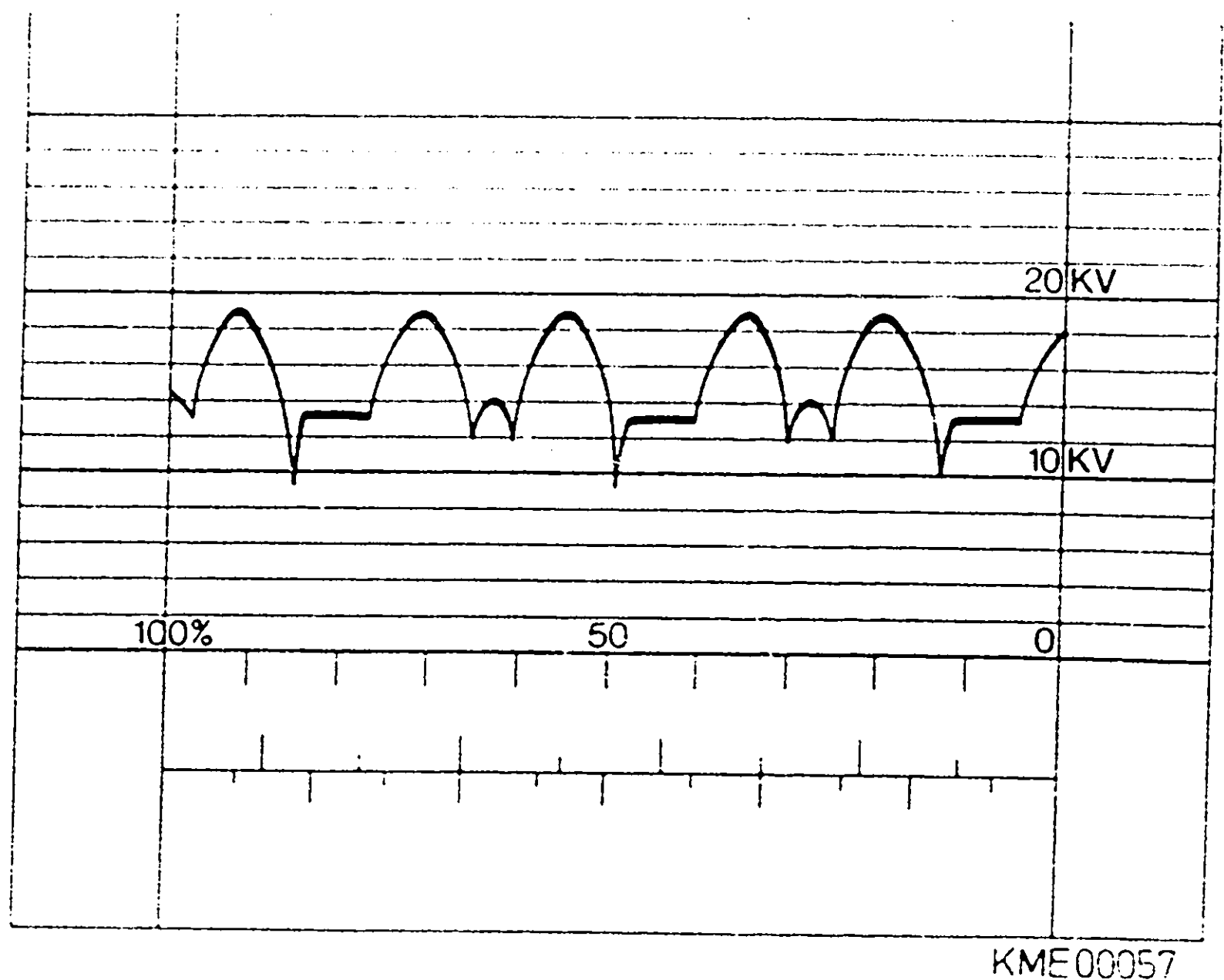
Continue: C23/1 Fig.: C22/2



SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows short-circuit in one or more positive diodes.

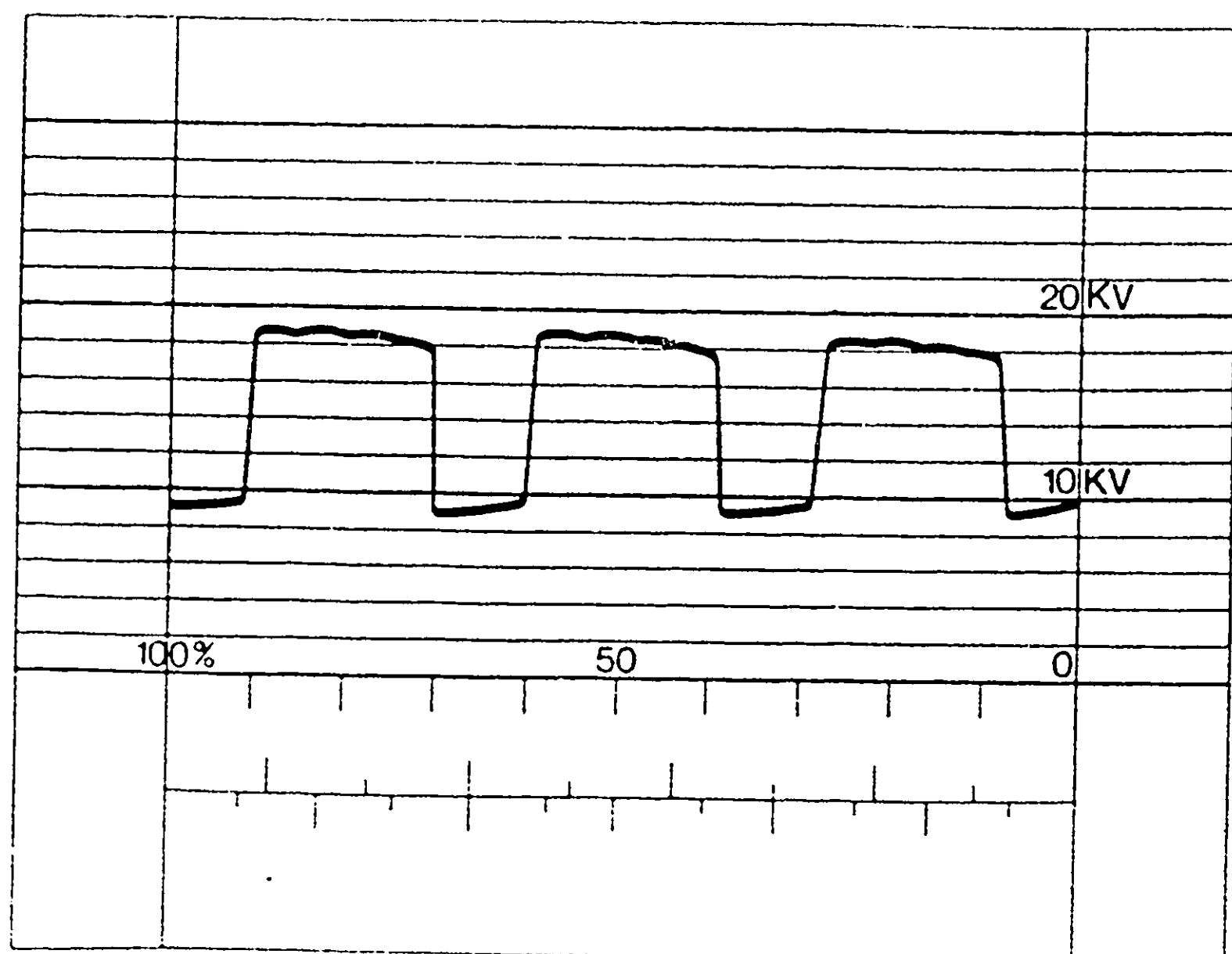
Continue: C24/1 Fig.: C23/2



SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows short-circuit in one or more negative diodes.

Continue: C25/1 Fig.: C24/2

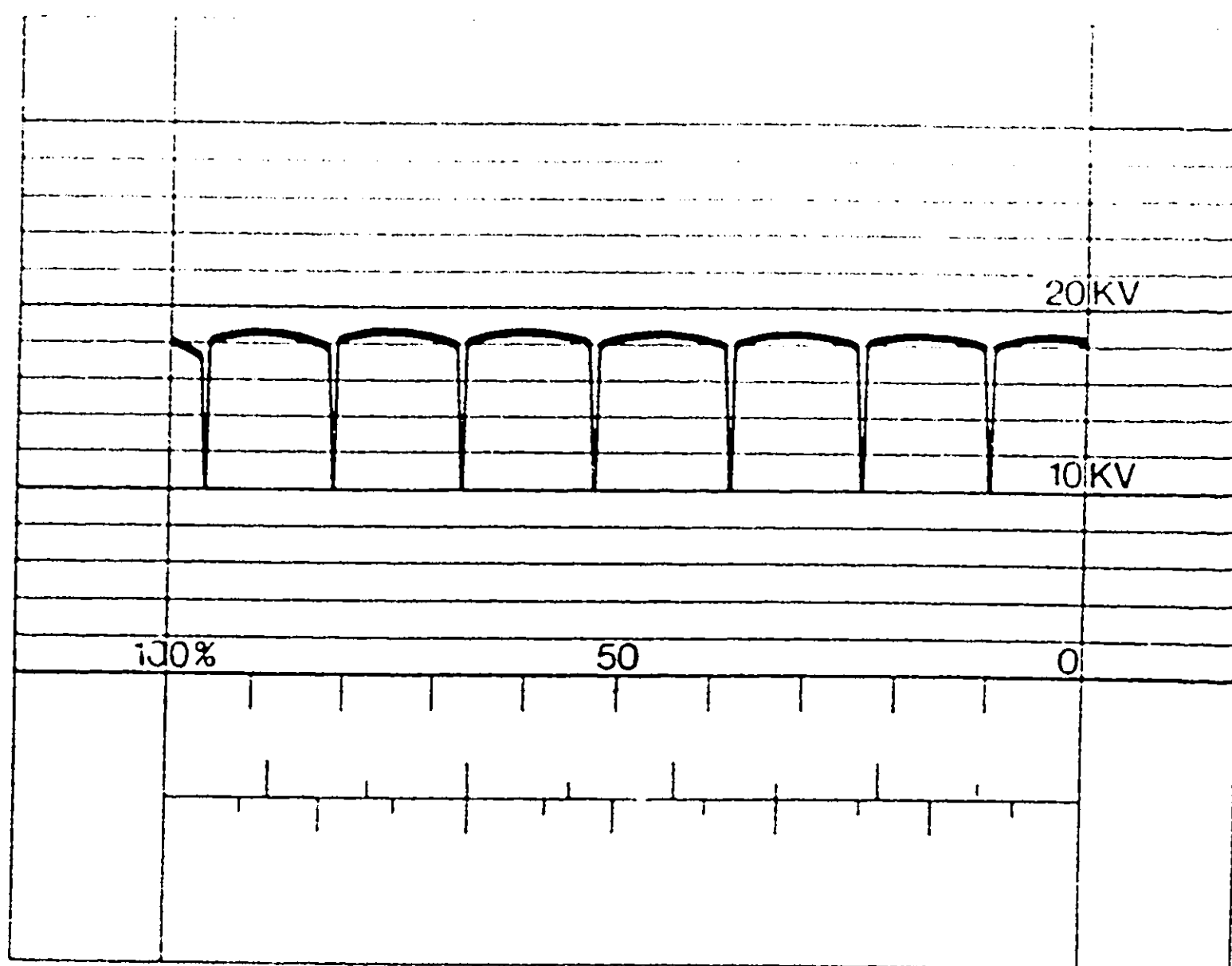


KME00058

SETTING AND EVALUATING OSCILLOGRAM

Oscillogram shows phase error
(open-circuit).

Continue: N25/1 Fig.: C25/2



KME00059

INDEX

Collector ring	/
Cylindrical-roller bearing	B13/B28
Deep-groove ball bearing	B13/C01
Expansion bushing	B15
Interference capacitor	A04/B02
O-ring	/
Pole body with winding	A04/B05/B18
Radial seal	/
Rectifier	B08/B12/B25
Regulator	C03/C05
Rotor without winding (windingless rotor)	B16/C04
Stator	B19/B27
Terminal W	B21/B23

Continue: N26/1

TABLE OF CONTENTS

Structure of this microcard	A01/1
Description of trouble-shooting	A02/1
Special features	A03/1
Test specifications, electrical	A04/1
Test specifications, mechanical	A08/1
Diagram(s)	A11/1

Continue: N26/2

TABLE OF CONTENTS

General	A14/1
Testers, tools and adhesives	A15/1
Exploded view(s)	A22/1
Disassembly of alternator and testing of parts	B01/1
Cleaning of parts	B21/1
Alternator assembly	B22/1

Continue: N27/1

TABLE OF CONTENTS

Testing alternator with regulator on test bench	C09/1
Testing with oscilloscope	C16/1
Index	N25/1

Continue: N28/1

EDITORIAL NOTE

Copyright 1990 ROBERT BOSCH GmbH
Automotive-Equipment After-Sales
Service
Technical Publications Department
KH/VDT,
Postfach 10 60 50, D-7000 Stuttgart 10

Published by:
After-Sales Service Department for
Training and
Technology (KH/VSK).
Time of going to press 02.1990.
Please direct questions and comments
concerning the contents to our
authorized representative in your
country.

Continue: N28/2

EDITORIAL NOTE

The contents of this microcard are
intended only for the Bosch Franchised
After-Sales Organization. Passing on
to third parties is not permitted.

Microfilmed in the Federal Republic of
Germany.

Microphotographié en République
Fédérale d'Allemagne.

Continue: ■